

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper—Second-class postage paid at Boston, Mass.

Vol. III, No. 31

August 6, 1969

Price: \$9/year

But No Communications

IBM Offers New Small System at \$945 per Month

NEW YORK—A break from the traditional format of the punched card marked the announcement of IBM System/3. Developed especially for small business firms, System/3 contains a number of major innovations, including:

- A small, 96-column punched card with 20% greater information capacity than the familiar 80-column card;
- Disk storage ranging from 2.45- to 9.80-million characters;
- RPG II—an expanded version of a popular programming language; and
- Monolithic Systems Technology (MST).

Typical Configurations

A typical System/3 disk-oriented configuration would consist of a central processing unit with a 12,288-character (byte) main memory, a 4,900-million-character disk file, a multifunction card unit (MFCU), an offline sorter, a 200 line/min printer, and two data recorders. A typical card-oriented version might include an 8,192-character main memory, MFCU, offline sorter, a 100 line/min printer, and a data recorder.

System/3 itself requires only 150 sq ft of floor space. All

system units, printer, central processing unit, and multifunction card unit, are connected to each other by above-floor cables concealed behind a decorative panel.

Central Processing Unit (CPU)
The CPU houses the addressable main storage, arithmetic and logic units, the control system with registers to sequence instructions and initiate communications between memory and input-output devices, an operator-oriented inquiry and control console, and an optional dual program feature.

The basic technology used is IBM's new Monolithic Systems Technology (MST), which provides up to five circuits in a module. In System/3, MST circuits enable switching speeds of from 8-12 nanoseconds.

- The CPU features:**
- Basic Core Storage: 8,192 characters, expandable to 32,768 characters;
 - Add time (two five-digit numbers 26 microsec);
 - Memory cycle (to fetch and store eight bits): 1.52 microsec;
 - Internal Machine Code (MFCU): The IBM System/360 machine code, (eight bits plus a parity bit).

With the disk version of System/3, the optional dual program feature will enable two independent programs to be loaded and run concurrently. The CPU can move to another program when one in progress is using only an input or output unit. In this way, the high-performance capabilities of the CPU can be used with greater efficiency since the processor does not have to wait for the input/output devices to complete a job before working on a second program.

System/3 Prices

The basic system can be rented for as little as \$945 per month, but, a typical card version, including a data recorder and service will be priced at \$1,145 per month rental, or \$15,480 purchase. A typical disk version of System/3 with two data recorders will rent for \$1,870 monthly, or \$83,900 purchase.

The RPG II compiler will be licensed at \$35 monthly for the card version and \$45 for the disk system; other programs produced will be licensed for \$10 per month.

The Application Customer Service is available from \$180 to \$265 an application, as a single charge.

New IBM Punched Card

A new, small punched card, only slightly larger than a standard wallet-sized credit card, is the basic data medium for System/3. With 96 columns rather than the traditional 80, it can accommodate 20% more information and, despite its size, four lines of type can be printed on

its face. The card characteristics are:

- Dimensions: 2.63 in. high by 3.25 in. wide
- Hole size: 0.046-in. diameter
- Print positions: 128 (four lines of 32 positions) maximum
- Punch positions: 576 over 96 columns
- Code: 6-bit EBCDIC-like.

The MFCU is a single machine that reads, punches, collates, prints, and sorts cards in one path without intermediate operator handling. Two models are offered.

Disk Storage Facilities
Disk storage for System/3 consists of one removable disk cartridge and one fixed disk on a (continued on Page 4)

Special PDP-10 Software Available as T/S Service

By Peter L. Briggs
CW Staff writer

WALTHAM, Mass.—Large-scale modeling, on-line graphics for the data terminals, the solution of big matrix problems and other large analysis programs will be among the services offered by a new time-sharing company, Computer Utilities, a subsidiary of Codon Corp.

Using the processing power of the PDP-10 (which is claimed to execute programs 50 times faster than CP-67), the additional techniques of virtual memory, large-scale communications equipment, and several software packages developed through time-sharing work at MIT and elsewhere, Codon intends to support large numbers of users doing highly sophisticated data processing, according to Berrell Stone, company president.

"With the tremendous speed of the PDP-10, and the wide expertise of the people here in all areas of specialized services for remote computing, we can offer several unique alternatives. One of the most important, we

feel, is the capability to support the Adis graphics terminal," he said.

Special Capabilities

The company has developed its own Cobol compiler for the PDP-10 (a year ahead of the expected release date for the DEC Cobol) and an RPS translator. Other languages supported include Fortran IV, Basic, and Adis (a graphics package developed at MIT).

The various types of work to be supported include: ordinary time-sharing over teletype writers, use of either high speed or low speed displays (high speed at up to 4,800 bits per second), satellite computer processing for either high-volume data transfer or multifunction I/O, remote batch processing, and self-contained time-sharing (Scots, a recent development that allows several different terminals connected around a satellite to operate as an apparently independent time-sharing system).

(continued on Page 4)

Pen Digitizes Information, Also Produces Hard Copy

SOUTHPORT, Conn.—One of the most recent entries in the graphical/digital recording field is the GrafPen. Developed by Science Accessories Corp., the unit allows a user to write on a tablet, using normal paper, and have the information digitized and transmitted to other remote stations or directly into a computer for analysis.

Hard Copy Available

One of the advantages of the GrafPen, the company said, is the capability to produce permanent records of all recordings with the ballpoint pen mounted in it. The pen is connected to the control unit through a cord, allowing complete flexibility in use. The tablet, a 10-inch square, can be placed on any desk and used conveniently for transmission or recording.

\$2,800 Complete

The company, a member of the North American Phillips group, manufactures the device here at Southport, and intends to sell it, device for \$2,800 for

single units. The price will be significantly less for quantities and stripped-down models, according to Leigh H. Hickcox, the

(continued on Page 4)

IRS Is Releasing Income Tax Tapes to State Officials

WASHINGTON, DC—Federal tax information is being sent on tape to state tax officials, who in turn can pass it on to local authorities.

Since 1935, the Internal Revenue Service (IRS) has been authorized to tell state tax authorities the contents of federal tax returns. Two years ago, the IRS began offering this service on tape, and 34 states now subscribe.

Information on the tape includes name, address, income, and reported dividends and interest. Some states use it just to look for people who filed federal returns but not state returns (C.W. May 21), others use it to check the consistency of certain figures. Using the

federal tapes, Oklahoma last year collected \$3.5 million in extra taxes and California got \$10.3 million.

Although it is not common yet, state tax officials can pass the information on to local jurisdictions. Such redistribution requires the prior approval of the IRS, which checks on local security provisions.

One state that redistributes information is Pennsylvania. County commissioners there are given printouts containing the names and addresses of people in the county who reported dividends, or interest on federal tax returns. The counties use this information to look for people who have not paid a personal property tax.

An IRS spokesman claimed that the IRS was particularly concerned about assuring the confidentiality nature of the information. Federal statutes involve penalties of up to \$1,000 and one year in prison for unauthorized disclosure, and IRS officials review the security provisions at each installation to receive tax return information.

Although the IRS has been authorized to distribute this information since 1935, the advent of computer tape has made it possible to distribute complete information easily. Some concern has been expressed that this will result in widespread distribution of tax information, and that leaks are inevitable.

Rep. Cornelius F. Gallagher

(D-N.J.), chairman of the Special Subcommittee on Invasion of Privacy, noted that those who wrote the original law "had no knowledge of the developing computer techniques." He declared: "This is one of a continuing series of instances where

(continued on Page 4)

On the Inside

Applications	13
Editorials	8
Education	15
Financial	21
New Products	6
Societies	14
Software	11

Proposed Registrar Would Keep Track of Data Banks

TORONTO, Ont. — A registrar of data banks would be appointed under a bill introduced this year in the Ontario legislature.

The registrar would keep a list of all data banks, their purpose, and the kinds of information stored in them. He would have the right to order entries expunged if he felt the entry "might result in undue hardship upon any person."

Get Copy of File

In addition, any data bank not operated by the police would be required to give to any person, on demand, a printout of all data relating to him contained in the bank. Such a printout would also contain "the purpose for which the data contained in the printout is to be used," "the

purpose for which the said data has in fact been used since the last printout," and "the names and addresses of all recipients of all or part of the said data since the last printout."

In addition, any nonpolice data bank would have to send a person a similar printout within "two months after his name is first programmed into such a data bank."

Little Chance of Passage

But the sponsor of the bill, Tim Reid, said, "It is highly unlikely that my bill as it presently stands will become law in this province." The reason, he reported, is that it is a "privatist member's bill," and furthermore introduced by a member of the opposition.

Reid also noted, "I understand

that the attorney general of Ontario is contemplating such legislation, but probably he would not introduce such legislation until well into 1970."

Most Computers Listed?

The bill calls for the registrar of data banks to set up a register

that would list all data banks. Reid defines a data bank as "a computer that records and stores information." The owners and operators of the data banks would be required to supply the necessary information.

This register would include the name and address of the operator of the data bank, and its

purpose. The register would be open to the public.

Furthermore, data banks containing "personal information related to identifiable persons" would be required to keep a written log recording the date of "each extraction of data," the name of the person requesting the data and its purpose.

360/30 Partitioned for Multiprocessing

ELIZABETH, N.J. — In what is described by the user, as an industry first, a small central processor is being utilized in a multiprocessing, partitioned mode disk operation. The new application is being implemented by Wakefern Food Corp., a local supermarket distributor, to

handle store order processing from its 140 locations.

Charles Whittle, director of communications and information systems, stated that neither Wakefern nor IBM knew of a previous case in which a 360/30 had been utilized to process both resident programs and tele-

processing input data simultaneously.

The communications capability was added to the Model 30 with the installation of a 2702 communications controller that enables the central processor to accept and process line-at-time teletypewriter input. A second system is similarly equipped for backup purposes.

The Model 30 calls individual stores and completely processes orders for grocery, produce, meat, nonfood items, etc., while simultaneously processing another program. Additionally, Wakefern will use its telecommunications and computer facilities to receive store payroll data.

The total electronic order-processing system is a forerunner of future applications that Wakefern is planning employing the teleprocessing capability. Whittle stated that the new system is a vehicle for substantially reducing order-processing costs and ensuring greater data validity. The new operation demonstrates the economic advantages of multiprocessing and teleprocessing using small computers. This capability was previously thought compatible only on much larger systems, he said.

Computer Center Used to Attract Office Tenants

DAYTON, Ohio — Will computer availability make it easier to attract tenants to an office building? A local service bureau thinks so.

Ahart and Associates, an engineering design firm that has branched into the service-bureau field, bought and renovated a six-story building. The firm hopes that tenants will need its computer services, and that the computer services will attract tenants.

James A. Ahart, president of Ahart and Associates, said that the firm selected a downtown building because they wanted "to add impetus to the redevelopment of downtown Dayton." Ahart has spent \$1 million to buy and renovate the Stomps building. They will occupy 10% of the building themselves.

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IBM's System/3 Utilizes RPG II Programming Language

(continued from Page 1)
single drive. In effect, this arrangement provides the capabilities of two disk drives.

The entire unit can be installed at the customer's site and is housed in a sliding cabinet located beneath the MFCU. Four configurations of the disk storage unit will be available: two using dual drives; two using a single drive.

The single drive configuration accommodates two 14-in. disks (one fixed). Average access time for the 2.45-million-character version is 153 milliseconds; 269 milliseconds for the 4.90-million-character version.

Storage capacities of 7.35-million characters and 9.80-million characters are available on the two-drive configurations. The former requires three 14-in. disks (one fixed, two removable); the latter, four disks (two fixed, two removable). Average access time is 269 milliseconds for both configurations.

Printers and Sorters

System/3 printers are offered in 100- and 200-lines-per-minute models, with a 48 character set, 96 print positions.

An optional Universal Character Set is available to extend the set to a maximum of 120 and the number of print positions to 132.

A printer-keyboard, which includes a Selectric Unit and type-writer-style keyboard, is available as an option. Mounted on the console worktable, the device may be used for both input and output functions.

It supports such applications as inquiry, data entry, communication between operator and system, and as a second printer.

Tabletop 1,000- and 1,500-card/min sorters are offered to users. Each has a hopper capacity of 2,000 cards and six stackers. Each stacker has a capacity of 650 cards.

Special features permit sort selection, digit selection, and alphabetic sorting with a reduced number of passes.

The sorter uses photocopied writing and has a built-in card storage rack.

The IBM 1255 magnetic character reader, used off-line, can process up to 500 checks and other bank documents per minute.

Off-Line Data Recorder

Designed especially for the new

small card, System/3's off-line data recorder for punching and verifying cards incorporates a number of features that help improve operator performance and minimize the chance of entering incorrectly punched cards into the computer.

Data recorder characteristics include:

- Hopper and stacker capacity: 350 cards
- Keyboard: 64 characters
- Card Speed (punching, reading, and printing): 20 columns per second
- Delay line storage capacity: seven 96-column card images, including four program formats and three data storage areas.

An optional data entry keyboard for System/3 can serve dual functions. It will feed key data directly into the CPU, with appropriate programming, can punch cards using the punching facility of the MFCU.

System/3 Programming

The programming language for System/3 is RPG II, a language based on the widely used System/360 RPG.

Also, to assist new customers and those who may be making a transition from unit record to computer operations, the IBM Application Customizer Service will provide most of the tools needed to write application programs tailored to individual customer's needs.

To use RPG II, the customer writes his program using English-like statements and simplified coding specification sheets, describing all data processing functions the program is to perform.

This information, the form in which the input data will appear, how the calculations are to be performed, and the format of the desired report, is punched on cards and entered into the computer via the MFCU. The RPG II compiler, stored in System/3's memory, handles the processing details.

RPG II contains a number of new programming facilities: The ability to "look ahead" at computer-stored data yet to be processed and the use of a debug facility for program testing.

The Application Customizer Service will be used to help customers prepare programs for order writing and invoicing, accounts receivable, inventory accounting, sales analysis, payroll, and general ledger jobs.

The customer, working with an IBM representative, defines the particular job he wishes to perform by answering a series of prepared questions.

His answers, in effect, will describe the steps the computer must take to handle the job, as well as the format of the report he wants.

This information then will be punched onto cards and fed into a computer at an IBM basic system center.

The Application Customizer, an IBM proprietary program, examines the input data, analyzes the user's requirements and spe-

cifications, and quickly determines if the job can be done as the customer wishes.

The result of the analysis is a set of documents and programming aids, including a system flowchart, data dictionary, error listing, record layout, program definition, and sample report. These are used by the customer's System/3 programmer to write the desired application program in RPG II.

The final step is testing of the completed program using representative data. If the program is satisfactory, "live" data is sub-

stituted for the test data and the program is ready to go to work. The Application Customizer Service will be available to System/3 customers at IBM basic systems centers around the country.

Program products for both card and disk versions include, in addition to RPG II, a sort program and utility programs.

System control programs for the card system include user maintenance and system initialization for the disk system; library maintenance, system management, and disk utility functions.

IRS Is Releasing Tax Tapes to States

(Continued from Page 1)

The search for efficiency may be jeopardizing confidentiality," and concluded, "We must keep our laws abreast of the new technologies which can adversely affect human values."

New York Gets Tapes

Another state using the tapes is New York. The federal tapes are provided for IBM equipment, so New York translates the tapes for use on its Univac system and returns the original tapes to the

IRS. The information needed by the state is gleaned from the translated tape which is then erased. The final tape is kept under the same security as the state's own tax records. According to Malcolm Pitkin, assistant director of EOP, the State Department of Taxation, the state uses only 7% of the information on the IRS tapes.

So far, New York does not pass on information to any local governments, but Pitkin noted that there is discussion of giving

information to New York City, which has its own income tax. New York City's tax is levied against nearly half of the state's taxpayers. If New York City were to get copies of IRS tapes, security would be overseen by the IRS rather than by state officials, according to Pitkin.

So far, the IRS has distributed tax returns covering 1966 and 1967. Information from 1968 returns, filed this April, will not be distributed until processing is completed later this year.

Pen Digitizes Data, Produces Hard Copy

(Continued from Page 1)

company's marketing manager. Basic capabilities include the ability to produce written records, direct connection to the CRT display which is equipped with a buffer system, direct location of the desired point on either the display or the drawing, and the ability to produce any type of writing such as handwriting, line drawing, or point marking with either continuous line or single point marks.

The complete unit, including the CRT, the control unit, and the tablet and pen, is included in the \$2,800 price, according to Hickcox. He further pointed out that even a check could be writ-

ten remotely, with the use of the system.

Specifications

The x-y position of the pen is resolved to within 0.01 inches, with overall accuracy of 0.03

inches. Reproducibility is accurate to the least-significant bit in 10 for the 10-inch square tablet, and the unit will generate pairs of coordinates at speeds up to 300 per second, according to the company.

T/S Firm Offers PDP-10 Services

(Continued from Page 1)

A benchmark program was run on the IBM CP-67 time-sharing system using the Aids package. The comparative times for the runs on the S/360 and the PDP-10 were: assembly, 10.1; loading program, 2.1; and execution, 30.1, according to figures obtained from the company.

One major area which the company intends to enter, State told CW, is financial modeling. Cash allocation and short-term cash assets management are two immediate possibilities for this particular application.

The company has offices here at 400 Totten Pond Road, the company's first computer site.



COMPUTERWORLD

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Robert M. Patterson, Executive Editor; Neal Winter, National Sales Manager; Margaret Polson, Circulation Manager; Henry Flint, Art Services Supervisor; Kate Rachtstein, Typesetting Services Supervisor.


W. Walter Boyd, Publication Manager; Patrick J. McGovern, Publisher.

Subscription rates are: \$9 for one year, \$20 for three years. Add \$1 per year for Canada, \$4.50 per year for Europe. Please send all editorial and subscription material to: COMPUTERWORLD, 797 Washington St., Newton, Mass. 02180. (617) 332-9000.

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Computers Evaluate 'Safeguard'

WHITE SANDS, N.M. — The Army's Safeguard System Evaluation Agency (Safesa) is using a computer complex to evaluate critical aspects of the Safeguard ballistic missile defense system.

A Univac 1108 with Exec 8 software is the main operating, test, and simulation device used by the agency. It was installed and operating 75 days after receipt of order, Univac said.

The system also includes an on-line Univac 9300 computer, six Univac 300 visual communication terminals, one Univac 1557/1558 graphic display system, a Univac 1004 card processor, and a high-speed communications subsystem.

The equipment is evaluating such critical factors as effectiveness of deployment, mission reliability, identification of targets, kill probability, and systems availability.



A Univac 1557/1558 graphic display subsystem is used to display information needed in evaluating critical aspects of the Safeguard missile system.

As the centralized evaluation agency for Safeguard, Safesa performs independent evaluation for the system manager of the system's hardware, software, personnel, logistics, documentation, physical plant, and safety standards.

Under the Safesa contract, Univac's federal systems division op-

erates, maintains, and manages the total system.

Safesa, based at White Sands, reports directly to the Army's Safeguard system manager in Washington, D.C.

Univac has been participating in a portion of the research and development of the Safeguard system.

\$400,000 in New Revenue Claimed

Countywide System Aids Communications

RIVERSIDE, Calif. — One of the nation's largest counties has teamed a computer with two communications systems to simplify governmental processes and generate \$400,000 annually in new revenue.

The computer-based installation earned Riverside County, Calif., almost \$90,000 in added interest and dividends on county deposits last year and helped law enforcement agencies collect an extra \$325,000 in traffic fines.

Built around an IBM 360/40, the network keeps officials in instant contact with each other throughout this 200-mile-wide county that is almost as big as Delaware, Connecticut, and Rhode Island combined.

"We felt that faster tax collection and improved law enforcement would justify our use of this computer," said George Mathews, county director of data processing. "But the system has surpassed our most optimistic expectations."

"The two communications setups — a microwave county network and a sheriff's telecommunications system — already were in operation before the computer arrived."

The microwave radio hookup was begun in the 1950s to link the desert cities — Palm Springs, Indio, and Blythe — with the more densely populated western portion of the county.

Later the sheriff's department set up the telecommunications system that allows seven sheriff's stations and 15 police depart-

ments to work together. All told, more than 300 separate county locations can eventually be linked to the IBM system by teletype-network terminals.

The computer, since being tied to both networks in 1967, has taken on increased duties each year. It currently is helping the county save money in accounting, administration, elections, civil defense, personnel administration, and property assessment, as well as tax collection. The tax collection and election counting procedures are pioneering applications.

In years past, taxes were collected, then checks and stubs balanced on adding machines," Mathews said. "That was just the first step in a process that sometimes took as long as 17 days before the money actually reached the bank. Obviously, we were losing interest during that period."

"Today, the computer does continuous calculating, balancing, and recording as taxes are collected, allowing the county treasurer to deposit the money the day it's received. That means more interest on our money."

"When you're dealing in interest on millions of dollars," he said, "just a few days' delay can cost you quite a bit of money."

The traffic collection system is even more rewarding.

"Before, if the Palm Springs

police ticketed a traffic violator, only his previous unpaid Palm Springs warrants would show in their files," Mathews said.

"There was no workable way to check with all the other county law-enforcement agencies, and as a result, most outstanding warrants were not being collected. 'Now officers can find out almost instantly from the computer if a violator has traffic warrants outstanding anywhere else in the county. This has meant from \$25,000 to \$30,000 a month in revenue.'"

As a bonus, the computer-based network has vastly simplified vote tabulation in this far-flung Southern California county of 460,000 that holds more than 125 elections each year.

The IBM system, printed with up-to-the-minute voter registration files, can print out lists of qualified voters by precinct or school district — from presidential elections right down to local contests.

"On election day, we poll the voting machines automatically through our network just as most counties do by hand over the telephone," Mathews explained. "The only things done manually in the last election here were the voting itself and the placing of the ballot sheets in the vote-counting machines."

"The communications network and the computer did the rest."

CDC Takes Hesitant Step Toward Separate Pricing

MINNEAPOLIS, Minn. — Control Data took a hesitant step toward separate pricing of products and software last week, thus joining IBM and Burroughs, Honeywell and Univac have decided not to unbundle.

"Control Data has separately priced some special use applications software, certain systems engineering, and consulting services for a number of years," the company said. "Further separation of our total computer systems offering is now possible, thus allowing the user a free choice in selecting among the available services."

Unbundling apparently will be accompanied by a price increase. After noting that actions by "several computer manufacturers" have "resulted in an

overall price increase for the total package," Control Data stated:

"Control Data believes that a price increase for its systems is justified by their increased performance, as well as by the rapid inflation in facilities, material, labor, and interest costs which have occurred in recent years and which can no longer be compensated for by increased efficiencies."

The company said it was studying methods for restructuring its pricing to include further separation of hardware, software, and services, and "we will announce them in due course."

CDC's existing prices, price structure, and policies will be continued in the meantime, the firm said.

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See Page 10

Low Price Mini Offers 4K Memory, Parallel Processor

NEWPORT BEACH, Calif. — A low-priced mini is aimed at applications that include communications control and message processing, data acquisition, and process control.

The Model 208 is an 8-bit, stored program, parallel processor, with a cycle time of 2.6 μ sec. The price of a basic 4K version is \$5,590.

The developer, Computer Automation, Inc., says it has a large instruction set and requires only one eight-bit word to execute shifts, register change, and control.

Software for the 208 includes an assembler, debug package, a math library, tape editor, maintenance programs, loaders, and utilities.

Peripherals include disk and magnetic tape, a card reader, paper tape equipment, and a Teletype.

The company is located at 985 W. 16th St., Newport Beach, Calif. 92660.

Communications Terminal

A communications terminal system, Model DF33ASR-0, requires no data coupler because

the terminal uses a direct connection to the standard telephone line.

The communications components are built into the terminal, providing a neat compact arrangement without the need of extra acoustic devices, according to Data Access Systems.

The terminal is suited to a wide range of applications such as time-sharing, terminal-to-terminal communications, and computer access.

It transmits and receives at 100 words/min. Error free transmission is assured by using a fully filtered transmitter and receiver data set which rejects harmonic and spurious signals.

Direct electrical connection and a conditioned telephone line further, insure distortion free transmission, the company added.

The unit is available in a variety of configurations and may also be used for automatic answer or unattended mode operation.

The Model DF33ASR-0 is priced at \$1,550 and delivery is from stock. Data Access Systems, Inc., P.O. Box M 418

Landing, N.J. 07850.

Microfilm Printer

Flo-Graphic Model 1010 is a self-contained microfilm-to-hard-copy printer (also hard-copy-to-film) capable of high-speed, high-quality, off-line printing, according to Interface Sciences Inc.

NEW PRODUCTS

Input is in the form of 400 ft reels of 16mm or 35mm perforated or unperforated film.

Output is paper in widths from 9-3/8 in. to 18 in. or single sheet paper up to 18 in. wide by any length.

The Flo-Graphic is capable of printing up to 3,000 pages/hr with one operator. No special level of skill is required. The type of printout can be opaque, translucent, or offset plate.

A special feature of the Flo-Graphic 1010 is its operation both as a continuously adjustable enlargement (projection) machine or as a paper-to-film (microfilming) machine.

The unit prints images onto sensitized paper, printing plates, and many other sensitive materials. Printing speed is variable — 5 to 50 ft/min.

Lease prices are from \$500 monthly. Interface Sciences, Inc., 2 W. 45th St., New York, N.Y. 10036.

Sound Silencer

A new device is specially designed to silence Models 32 and 33 teletypewriter machines.

The unit, named Acousti-Cabinet, reduces sounds from a teletypewriter by about 90% even with punch, reader, and printer operating simultaneously, Commatic Systems, Inc. says

With the hood open to permit preparation of messages, sound is reduced about 70%.

It is particularly advantageous in applications in which the teletypewriter is located near a secretary or other operator or where a number of the units are placed in close proximity.

Acousti-Cabinet is priced at \$195.

Commatic Systems Inc.; 8720 Woodley Ave., Sepulveda, Calif. 91343.

Analogue Converter

The Series 700 Analogue-to-Digital converter, produced by Biomation/Datalab, combines fast conversion with high resolution, low aperture times, and temperature stability.

All models were designed expressly to interface easily with computer systems of all degrees of sophistication, the company states.

The 710 is a 10-bit converter with a conversion rate, including sample-and-hold, of 200 kHz. The 712 is a 12-bit converter with a conversion rate of 125 kHz. Multiplex inputs of either 2, 4, 8, or additional increments of 8 up to a maximum of 64 inputs are available as an option.

The sample-and-hold circuit with an aperture time of only 20 nsec insures that the units meet the accuracy requirement for high frequency input waveforms. During sampling the circuit tracks the input continuously until the hold command is received; at this time the conversion process is initiated. This technique provides superior resolution for high frequency inputs.

All models are completely self-contained, featuring precision-stabilized power supplies, differential input stage, sample-and-hold circuitry, digital logic control, and neon binary displays. Prices are \$1,650 for Model 710 and \$2,250 for Model 712.

Biomation/Datalab, 1076 E. Meadow Circle, Palo Alto Calif. 94303.

Paper Tape Punch

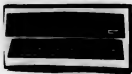
A new paper tape punch utilizes a unique keyboard, similar to that of a typewriter, allowing untrained operators to prepare printer control loops and computer data input codes.

Designated the Model 58, the punch will prepare either 5- or 8-track paper tapes.

PORTABLE TERMINAL

... for TIME-SHARING Modified TELETYPE Model 33 KSR & ASR (Friction and Specified Feed) AND Acoustic Data Sets

Remotes at 1032 data and control functions IN STOCK IMMEDIATE DELIVERY Sale or Lease



Control Computer



Communications Terminal



Sound Silencer



Analogue Converter



Paper Tape Punch

Each numbered key corresponds to one tape channel, with the least significant bit being located to the right of the keyboard.

To advance the tape to the next location to be punched, the operator uses a typewriter-type space bar that advances the tape one frame at a time.

A digital readout slot displays to the operator the frame being punched.

Data Devices, Inc., 18666 Topham St., Tarzana, Calif. 91356.

APL PLUS is here!

for scientific and commercial applications See Page 10

360's FOR SALE AND WANTED

IPS has for sale the following 360 equipment for immediate delivery: 360/30 86K CPU, 360/30 16K CPU, 2860-2 Selector Channel; 2404, 2402, MAI 2401-11 tapes, 2841 and 2311's. Two 360/30 86K CPUs for Sept., 1969 and Jan., 1970 delivery; 2401-S 90K8 tapes for December delivery. We are looking for a 360/65 CPU or system, a 360/50 CPU, a 360/40 131K CPU, and any peripheral units for delivery in next few months. If you own such equipment and are upgrading, please let us know. For details and prices on equipment, please call or write.

IPS

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INFORMATION PROCESSING SYSTEMS, INC.

1467 SYLVAN AVENUE, ENGLEWOOD CLIFFS, NEW JERSEY 07533

New at Marquardt Computing: ATS/360 — the ultimate in up-dating data

ATS/360 (Administrative Terminal System) provides powerful fast editing capability. After typing in proposals, form letters, manuals, reports, manuscripts, master files, presentations, ATS/360 permits their instant retrieval from computer storage for updating, revision or correction. Only the new material need be typed in, and a completely revised draft can be printed out at 148 words per minute. Entire sections can be manipulated by typing a single command.

□ And here's the beauty part: Secretaries, clerks, technical writers, or executives can operate the system after only a few hours' instruction, using a familiar typewriter keyboard. When not being used as an on-line terminal, the equipment serves as a regular typewriter.

□ ATS/360 provides remote entry batch processing. Using your remote terminal, you can select from your library a program written in any language such as Fortran, Cobol, PL/I, GPSS, create new programs, or implement existing ones. Allowing a few hours' turn-around processing time, answers can be fed back to your terminal, messaged or mailed.

□ When inquiring about ATS/360, why not ask about APL time-sharing? The same terminal will give you access to the new, powerful, simplified IBM language... APL, effective for both business and scientific uses.

□ Call today and ask for "ATS/360 Information"; in Los Angeles area—(213) 781-2121; San Francisco Bay area—(415) 941-4039; San Diego—(714) 291-6344. Or drop a note to "Marquardt ATS/360 Information."

APL COMPUTING SERVICES DIVISION - THE MARQUARDT COMPANY

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Call Issued for National Study Commission

How Can Rights to Information Products Be Guarded?

WARRINGTON, Va. — A national commission to study the impact of information technology on the development and use of proprietary information products and services has been called for by the Information Industry Association. The call, which responds to concern of

members of the IIA for proper protection of information products prepared on computer tape and other computer-oriented media, was made at a special meeting on "Copyright-Related Protection for Information Age Products" held by the IIA here last month.

The IIA, composed of firms which develop and sell information products and services, and of manufacturers and suppliers of information-related devices and services, passed, after considerable discussion, a two-part resolution.

The first resolves that propri-

etary rights associated with the various information technologies and products are, as a fundamental principle, not only compatible with widest dissemination and use of information, but essential thereto.

The second resolves that, since the new information technologies may require extensions of or perhaps legal concepts different from those which heretofore have served the general welfare, a national commission should be established to study new technological uses of copyrighted works, and also, more broadly, the impact of these new technologies on the optimum development and use of propri-

etary information products and services, and to recommend appropriate legislation.

The establishment of a national commission, with a more restricted charter, is part of the copyright revision bill (S.543) now pending in the Senate. Attendees at the IIA meeting felt—that the likelihood of passage of this particular copyright bill was doubtful, and that rather than recommend an extension of the charter of the proposed commission, a call for a new commission was appropriate.

The IIA has its offices at 1025 Fifteenth St., N.W., Washington, D.C. 20005.

Software Writing Called 5% Inspiration And 95% Perspiration by IBM Attorney

Special to Computerworld

WARRINGTON, Va. — Computer programs are generally 5% inspiration and 95% perspiration, according to Elmer Galbi, an attorney on IBM's corporate staff. Galbi paraphrased Thomas Edison's bromide on invention while discussing IBM's proposed registration system for computer programs, at the Information Industry Association's meeting here last month.

Galbi noted that the actual coding of programs usually represents 25-75% of the total investment in the program. Preparing the documentation represents a comparable investment, he said. The actual concept used in implementing the program represents a very minor portion of the investment in the program, he added.

Galbi mentioned that IBM's registration proposal to the U.S. Patent Office was designed to: (1) protect the investment made in developing and implementing a computer program; (2) avoid inadvertent liability for someone who developed a program, independently, utilizing the same concept; (3) permit program protection which is inexpensive to obtain and easy to administer; and (4) encourage wide dissemination of concepts used in computer programs.

Under IBM's registration system [CW, Feb. 26], the developer of a program would deposit a brief description of the concepts used in developing the program, a copy of the program and, optionally, documentation with a registrar. The registrar would make public the concepts, but the program and documentation would be kept secret. No examination of the program's capabilities would be made. An oath would be required that the person registering the program had developed it himself.

Protection would thereby be granted against anyone who utilized a registered program without permission of the registration owner. Fundamental to this scheme is the belief that it is very improbable that a computer program of over 100 instructions

could be developed in identical form by two people working independently. The registration

system therefore would not be appropriate for relatively short programs or minor subroutines.

the computer industry's first KEY-TO-DISC data input system accepts the output from 60 or more key stations simultaneously

Time-shared input cuts data preparation costs 50%.

Now you can cut your computer input costs in half. This new innovation in data preparation techniques gives you two money-saving advantages over conventional keyboard or one-keyboard/one-magnetic-tape-ppt-operator systems: (1) the LC-720 employs a computer time-shared input; (2) it is the only system available that provides data output directly on IBM/360-compatible magnetic disc.

By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as \$4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/

360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tschler, Director of Marketing (201) 334-3713

LOGIC
CORPORATION

15 E. Euclid Ave., Haddonfield, N.J. 08033 (609) 428-6686

APL PLUS

is here!

for all
time-sharing users
See Page 10

Editorials

How to Buy Software

The responsibility of having to buy software (instead of getting it free from the manufacturer) worries at least one smaller user (see letters). He says he hasn't got the expertise in-house and he can't afford consultants.

The answer is simple: get free consultation.

After you have got enough information from the vendor to know whether, in theory, the package will do what you need done, ask him for the names of a half-dozen users. If he can't give you the names of experienced users, forget the package. You aren't in a position to experiment.

Armed with the list, call all of the users, not just one or two. Ask them whether they have found the package to be valuable. You are looking for positive, enthusiastic answers, not lukewarm ones.

If you get a really positive response, then discuss your particular needs. Data processing still is in a pioneering stage. It has come this far only through the cooperation of people in the field. Most DP managers will be happy to spend a few minutes discussing a package with you and probably won't mind if you want to come over for a more thorough investigation. After all, they may need your cooperation some time.

One last warning: before you buy, be sure you know something about the users you have talked to. If you know nothing about their reputations, you had better make a quick check on that before you accept what they have told you at face value.

After you have followed the above procedure to check out several packages that interest you, you should be in a position to make a sound decision.

Value of Consultation

Is paid consultation too expensive for the small user? Perhaps not, when you consider what he can get for his money.

CW recently interviewed a user who had grudgingly hired two consultants—and had been delightfully surprised by the unexpected benefits.

The consultants were hired to determine if the firm needed an in-house computer. One consultant looked at the firm's business DP needs and the other at its scientific DP needs, which were extensive. For a fairly healthy fee, both consultants said the firm should continue using service bureaus.

At that point, the consultation cost was high.

But the consultants did more for their money than just make the one recommendation. They supplied information on services and application packages that the client had not known of and they recommended that the client hire a DP manager to coordinate and plan the firm's use of outside services.

Officers of the firm told CW that the secondary recommendations were so valuable that they more than off-set the cost of hiring the consultants.

Reinventing the Wheel



Letters to the Editor

Read-Error Ties Up 360/30 Under DOS for 95 Seconds

Thought the following might interest you:

Re: Your research report, "How Much Do Tape Flows Really Cost You?" June 26, 1969.

If you use IBM's 360 Disk Operating System, time wasted on tape read/write error retry will run you many seconds, not milliseconds of precious computer time.

When a tape error is encountered, a transient routine must be brought into core from disk to handle the error. This means seeking, searching, and reading the transient phase directory on disk and then seeking and reading the core image phase. We realize the need to conserve core by not having the error routine resident in the supervisor; however, for each subsequent retry of the tape, the supervisor does not check for the phase already being present in core, but again brings it in from disk.

A spot watch timing of retries (100) on a permanent read-error showed elapsed time of 98 seconds! (360/30, 80-character block, being read in background partition, foreground inactive. DOS Level 19, 2401 Model 1 tape drive.)

It is our disposition option to print the record as read, note as an error, and continue job. For each permanent read-error encountered the system is tied up for 98 seconds. Five thousand 80-character records could have been read in this time!

What is IBM's answer to this incredible system design?

"The program is operating per system design; therefore no program change will be made. Advise your salesman to submit a report to the Marketing Division as to the customer's need for faster handling of tape errors."

R. Donmauer

Manager, Systems Department

Parents' Magazine Enterprises, Inc.
Bergenfield, N.J.

Unbundling With 3% Discount Benefits Only Large Users

In regards your editorial "Too Soon to Judge" (CW, July 23). I have read your paper quite thoroughly for the past few months and find very few remarks from the small user on "Unbundling."

In your editorial you state that the user will have to "take responsibility for the reliable operation of

his system." Since the computer market seems to be expanding into the smaller computers and since good quality personnel are becoming increasingly difficult to find at a reasonable wage, where do you expect the small company to obtain the expertise that is needed to judge whether or not its system is being run effectively?

I personally feel that "unbundling" is a good move, but not at a 3% decrease on a service that according to all the "trade" papers is costing me 10-15% of every computer dollar! We in the small user category (Model 30 or under) are saddled with the options of hiring consultants or IBM SEs which we can ill afford, while the large users with large staffs reap the benefits!

Bernard G.R. Brown,

Manager Systems and Data Processing

Enterprise Aluminum Co.
Massillon, Ohio

No Middle of the Road

I read your editorial "No Middle of the Road" (CW, July 16) and could only say, "Hey, wow, here's a first!"

Have read trade publication editorials for years and none has ever spoken as clearly and courageously.

Good work indeed—but I'll be keeping my eye on the underground press 'cause next month that's where we may be circulating.

William F. Winkler

Milwaukee, Wis.

Prices: Less in U.S. Money

Needless to say, we are more than pleased with the excellent report you gave on the introduction of our new Key-Edit system (CW, July 21).

We notice you quote a price of an eight-station system at \$1,900 per month including 9-channel tape output. Each additional key station is said to cost \$100 per month. These prices are accurate for the Canadian market but are considerably lower in the United States. The eight-station system would cost \$1,300 per month including 7-channel tape output (48,160 per month 9-channel tape), with each additional key station costing \$85 per month.

D. Philpott,

Director of Advertising

Consolidated Computer Services, Ltd.
Toronto, Ontario

Service Bureau Brings the Computer to Small Towns

LExINGTON, Ky. — The computer, which has helped solve many of the problems of major metropolitan areas, is now being applied to solve some of the problems of small towns.

A computer company formed three years ago in nearby Han-

Ky. — Appalachian Computer Services, Inc. (ACS) — is working in small towns and rural communities to help develop business and industry.

ACS is installing and operating computers in such small towns as Elizabethtown, London, Flor-

ence, and Bowling Green, Ky. These installations supplement facilities in Louisville and Lexington.

"For some time, the rush to computerize American industry has passed by the small-town businesses with needs as vital as those in metropolitan areas, but on a smaller scale," said Robert McKeynolds, ACS president.

"By making this kind of service available in nonmetropolitan areas, we are meeting a real need for high-speed data processing," he said.

To expand its program of serving these rural businesses, ACS has ordered an additional computer, an IBM 360/25, to supplement three Model 20s and a Model 25 already in use.

"We are offering small-town businesses — banks, schools, util-

ities, wholesalers, the medical field, and other commercial establishments — the same sophisticated services their counterparts in the major metropolitan areas have."

In the near future, ACS computers will be equipped with teleprocessing terminals to permit users anywhere in the state to use the systems remotely over telephone lines.

Small-town industries will use the large systems for such things as remote engineering design, inventory control, and record storage for supporting management information systems.

Banks will be able to keep individual savings and checking account balances on a computer and access the information by simply keying a request over a teletypewriter terminal.

ACS currently offers some 300 programs to the medical profession, banking industry, municipal government, wholesale grocery industry, rural electric cooperatives, telephone industry, manufacturing companies, retail accounting, public accounting, engineering profession, and secondary and higher-level education.

In addition, ACS also prepares real-estate tax bills for some 80 of Kentucky's taxing districts. This year, the company will prepare approximately three-quarters of a million tax bills for Kentucky residents.

McKeynolds pointed out that the remote computing capabilities to be developed when the new computers are installed will result in expanding the company's services.

Bad System Design Seen Hurting MIS Philosophy

LONDON — Substitution of traditional computer reporting applications for practical management information systems (MIS) is unfairly tarnishing the MIS philosophy, according to Los Angeles management consultant Ira S. Gottfried.

"Instead of developing practical MIS programs, many companies have rushed headlong into 'cure-all' computer reporting systems, which fail to aid the management decision-making process," Gottfried said.

The key to successful MIS, Gottfried continued, is the basic determination of reporting necessary to management planning and decision making.

"The management team that tries to use the computer reporting system to get critical decision-making feedback without first determining basic information requirements is disappointed and unfortunately associates the failure with MIS."

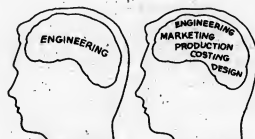
Gottfried emphasized that properly developed MIS eliminates unnecessary reports, gaps, overlaps, and conflicts in information requirements and effectively pinpoints critical decision-making information.

"The all-too-common practice of programming everything with-

out the initial discriminating search for workable information is costly and self-defeating," Gottfried concluded.

Gottfried, executive vice-president of Norris & Gottfried, Inc., made the remarks at an Industrial Education Institute seminar here.

Ordinary engineers have their place. Elsewhere.



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Ordinary engineers are the guys who sit in somebody's bullpen and slave away on a tiny part of some immense project. Doing the same kind of thing. Over and over, without ever really knowing what their contribution amounts to.

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Our technique is to let engineers get involved in as many different activities as they can handle. Technical proposals, design, development, costing, production, marketing, planning—you name it, our engineers get involved in it. And the involvement leads to commitment. It's worked out beautifully.

As a result we have a busy and extremely interested engineering staff. And

the finest line of memory systems and stacks and interconnect circuitry on the market.

It should surprise no one to learn that we're growing at a healthy clip. Just recently, we introduced our new digital Multi-Application Computer — MAC 16 — and that's

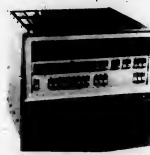
going to accelerate our growth.

So, we need more engineers. Good minds. Good technical backgrounds. And the desire to get involved.

We pay well. And, because of our continuing growth, we offer rapid advancement.

If you're interested in us and you've got an M.E. or E.E. and E.D.P. hardware or software experience, let's get together.

Write to me—E. J. Gage—at 6201 E. Randolph Street, Los Angeles, California 90022. Better still, call collect. (213) 722-6810. Naturally, we're an equal opportunity employer.



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SCIENTIFIC TIME SHARING
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See Page 10

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... easier to learn than BASIC ... and
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APL PLUS

is 5 to 12 times more powerful than FORTRAN and offers more overall productivity and economy than any other programming language.

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is easier to learn and use than BASIC.

APL PLUS

is much faster to program. In the chart at right is just one example, comparing FORTRAN, BASIC and APL PLUS.

APL PLUS

is the exclusive product of Scientific Time Sharing Corporation, the company that added the "PLUS" to APL. Here's what we mean:

SCIENTIFIC TIME SHARING is the first company offering APL with support for large INPUT/OUTPUT FILES for

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COMPARISON

Computing the average of a set of numbers:

FORTRAN
DIMENSION X(1000)
READ (2,XIN, (XIN=1,N)
6 FORMAT(15, (E15.2)
S=0.0
DO 4 J=1,N
4 S=S+X(J)
AVG=S/N
WRITE (3,5) AVG
5 FORMAT (E15.2)
END

Characters required:
FORTRAN-122

BASIC

DIM X(1000)
READ N
FOR I=1 TO N
READ X(I)
S=S+X(I)
NEXT I
AVG=S/N
PRINT AVG,
DATA
END

BASIC-75

APL PLUS

$(+/-X) \div N \rightarrow$

APL PLUS-10

**ASR-33's
SHOULD BE SCENIC
AND NOT HEARD**



Your ASR-33 doesn't have to forever remain an ugly duckling whose electrocubic bark is worse than its bite.

Not when the new quiet TTY enclosure from Novation can give your office The Sound of Silence and The Look of Beauty for only \$115 a month.

The Novation TE/33 is a modern enclosure especially designed for Model 32 and 33 ASR and KSR teletypewriters. It reduces the noise output of the TTY by 10 db

What does 10 db mean to your people? A 50% reduction in noise level to their ear. By comparison, the TE/33 is 4 db quieter than an IBM Selectric.

What does this mean to your office? Increased employee efficiency. No more shouting over machine noise. The silent Novation enclosure will pay for itself in work time gained. And it looks as good as it sounds. It's available with a built-in inductive coupler, too.

Enclosures, TTY's and Couplers for immediate delivery. Contact Jim Allen for details.



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you can put this proven, productive tool to work for you—call us today or rush the coupon to:

Scientific Time Sharing Corporation 2101 S Street, N.W., Washington, D.C. 20008 (202) 462-1195	SCIENTIFIC TIME SHARING CORPORATION 2101 S Street, N.W., Washington, D.C. 20008		CW-1 Rush information on APL PLUS.
	Name <input type="text"/>		
	Title <input type="text"/>		
	Company <input type="text"/>	Phone <input type="text"/>	
	Street <input type="text"/>		
	City <input type="text"/>	State <input type="text"/> Zip <input type="text"/>	

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August 6, 1989

Page 11

'Extracto' Can Offer Users Rapid Report Extraction

By Peter L. Briggs
NEW START WRITER
MONTREAL—A report generation and data extraction package called Extracto is now available for the S/360 and the Space 70 from Aquila-BST, a local firm.

The package, which sells for \$7,000, permits simple description of desired reports and rapid processing of requests in a batch environment. Jacques De Broux, a company official, told CW.

Available on a 30-day free trial basis, the package has been installed in three sites in Canada. One of the larger customers said that processing speed and the ease of obtaining the reports were its main reasons for selecting the package.

A benchmark program was prepared using a 3,000-record file of 208-byte records based on an IBM 2314 tape drive on a 360/65 under multiprocessing with a variable number of tasks.

The package processed nine reports in under 2.5 minutes of elapsed time. Projections for the DOS environment with a Model 30 could be expected to be between eight and ten times as long as the times for the 65.

Only Five Commands

The five commands required to use the package are TITLE, CRITERIA (for record selection), REPORT (to specify the contents of the report and its format), HEADINGS, and CONTROL (to specify total-breaks,

REQUEST VALUATION	
CARD IMAGE	
07010 TITLE	SALARY DISTRIBUTION
07020 CRITERIA	NIL
07030 REPORT	SPEE(5), SPACE,MATH(3,50)=GRUSS *52*/1000*/100,
07031	*1000.00 TO 5=999.99,SPACE(2),MATH(5,0)=TOTAL*11,SPACE,
07032	MATH(15,5)=2,TOTAL=GRUSS *52*,
07040 HEADINGS	SALARY RANGE COUNT TOTAL SALARIES
07050 CONTROL	DETAIL SUPPRESS,SUP-TOTALS=1,LINE-SPACING=DOUBLE.

** THE ABOVE REQUEST HAS BEEN ACCEPTED **

One of the nine input requests run for the programming benchmark on the 360/65. The report is intended to display the overall salary distribution for a 3,000-record personnel file.

detail reporting, etc).

The company, located at 1 Place Villa Marie, Suite 116, Montreal, Quebec, has been active in data processing consulting and Extracto is a combination of several projects the company has undertaken for local clients, De Broux told CW.

Several enhancements are planned and should be available before the end of the first quarter of next year. They include math routines for total calculations based on accumulated figures, record extraction and reformatting, update logic, multiline output from a single record (such as that needed for check processing), and online access to request control and run request statements.

Machine Requirements

The minimum machine needed would be a 24K 360/25 using DOS. This configuration would allow about five parallel requests and room for 25 field definitions.

There are no effective limits to the number of reports and definitions except those imposed by core limitations.

A version of Extracto that requires a 50K record under OS allows up to 25 simultaneous requests and 250 field definitions, DeBroux said.

SALARY DISTRIBUTION			
SALARY	RANGE	COUNT	TOTAL SALARIES
50,000.00 TO 5=999.99	166	166	847.20
51,000.00 TO 5=999.99	23	527	148.40
52,000.00 TO 5=999.99	4	95	726.76
53,000.00 TO 5=999.99	131	1000	870.76
54,000.00 TO 5=999.99	768	37,285	54,572.28
55,000.00 TO 5=999.99	1606	94,517	209,444.44
56,000.00 TO 5=999.99	239	11,500	109,476.76
57,000.00 TO 5=999.99	10	9373	105,556.16
58,000.00 TO 5=999.99	12	8102	111.40
59,000.00 TO 5=999.99	4	838	813.44
60,000.00 TO 5=999.99	1	810	765.44
61,000.00 TO 5=999.99	1	812	764.48
		2909	516,116,779.44

This report resulted from the request shown in the accompanying example. Formatting, field content, and headings were all specified in the original run request.

Batch input is prepared on predefined coding sheets that eliminate most of the problems inherent in using a structured language. The questions on the sheets indicate the needed information for specification.

Detailed mathematical capabilities is provided using APL conventions for the priority of ex-

pression of operators (left to right only).

The permitted operators are addition, subtraction, multiplication, and division as well as the logic operators and, or, and not.

The package is written in Assembler Language for the S/360 in order to minimize the core requirements.

'Cosma' Offers Truckers Rating and Billing System

By a CW staff writer
WASHINGTON, D.C.—A new computerized rating and billing system known as Cosma was introduced to the Middle Atlantic Conference of Motor Carriers during its recent membership meeting. The package, developed by Universal Systems Inc., received the formal endorsement of the MAC board of directors.

Saves 65 Cents per Bill

Offering Cosma as a service, Universal intends the package to eliminate the costly problem of processing paperwork. Charges for the service will range from 44 cents to 54 cents for each bill of lading processed, and Universal claims it still can save a company as much as 65 cents per bill over current costs.

The system operates over a time-shared network, allowing the trucking firms to enter transactions as they appear, rather than during the evening, after the trucks have returned.

Terminals are placed at each waystation, where the information concerning the shipment is entered. The computer provides

rates for the bills, formats the output, and prints the waybill at the time the shipment is prepared.

The company points out two major advantages to trucking companies using this system.

First, trucks can leave the terminal as soon as they are loaded, requiring no wait for road manifests. (The manifests are created and transferred directly to the destination, prior to the arrival of the trucks.)

Second, with advance notice of the arriving shipment, the destination station can provide more to show the trucker the amount and type of business each day, broken down by truck, terminal, and for the entire company. The service is being offered through Universal's computer center located in Bethesda, Md., at 2351 Research Blvd.

Facilities Management is Offered

By a CW staff writer
CHICAGO—Facilities management is now being offered by Technical Computer Services Corp. and the company says it is planning to provide, for a monthly fee, a computer center and all necessary programming on a turn-key basis for customers.

Programming, operations, and technical staff will be provided

by the company, as well as arrangements for obtaining the computer and the needed personnel. "We believe the service offers an appealing range of options and real economies for the moderate-sized user without a computer or one that has had an unsuccessful experience with its own computer center," said John R. von Kuehl, company marketing vice-president.

T/S Firm Offers 'Solve,' 'Teach'

By a CW Staff Writer
SILVER SPRING, Md.—A new time-sharing company, Telecommunications, will cover the Washington-Maryland area. The company has installed a Honeywell 1648 computer system, which is expected to handle up to 48 simultaneous users.

The service, priced at \$4.50 per hour of connect time, will offer Fortran, Basic, Solve (a mathematical language using logic expressions), and Teach (the Dartmouth-developed language and system for teaching the use of computers as an educational tool).

Conversion Service Builds Central Files

READING, Pa.—A new automatic conversion service for financial institutions converts scattered and disconnected computer information from existing machine-readable files into a central file in hours, instead of the many months previously required for manual changeover, according to a recent announcement by Systems Associates, Inc.

The service is offered in connection with installation of the firm's on-line central information system in banks and other financial institutions. It also has the potential to be used for any in-house conversion project in which elimination of duplicate names is a consideration.

The company claims that its service offers significant savings in time, personnel, and monetary investment required for manual creation of the centralized pool of valuable marketing information.

and speeded startup of a central file for several large banks, the company said.

In some instances, the job was completed over a weekend. And

in all instances, the service accomplished conversion with no disturbance whatsoever to normal banking operations, according to the company.

Software Maintains User Library

BOSTON—Plus, for program library update system, provides storage and maintenance of source programs on either tape or disk for the S/360, and can be run under either DOS or OS according to its developer, Cullinane Corp.

Any language can be stored, as well as test data, library files, or job control. The program will also generate complete job control setups to assemble or compile modified programs, according to Cullinane.

the programs and modification numbers.

The date of last revision, author, program description, number of statements, and number of changes are also updated and recorded.

Two other reports are produced by the program. One details the changes that have been made to any specific program, and the other lists the job control setups generated.

Plus can provide listings of programs stored or reproduce the programs on either tape or disk files.

The \$1,500 price includes documentation, installation, and training. The program is written in Cobol.

Library Index

The program generates a library index report following each run. The report contains a table of contents for the library, as well as version numbers for

'Off-Line' Processing Available

MINNEAPOLIS, Minn. — Users of International Timesharing Corp.'s time-sharing system now have the capability to access background job processing for remote batch operation, according to the company.

Jobs submitted for background processing will be automatically run during "idle" time for the processor.

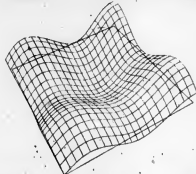
The user can then disconnect his terminal from the system, avoiding the connect charges associated with normal processing. The user can, at any time, request a status report on his background job.

Only six commands are required to access the background capability of the system: REQUEST, CANCEL, REPORT, REPEAT (which allows a read-out of the existing command string for a given job), EXIT, and LOGOUT.

A unique identification number is required for each entered program, allowing clear requests to be processed.

```
10 PRINT "NO. OF APPLES?"
15 INPUT X
20 PRINT "NO. OF ORANGES?"
25 INPUT Y
30 LET T=X+Y
35 PRINT "TOTAL APPLES & ORANGES =" T
```

Sample program to demonstrate background processing with the ITS system.



A three-dimensional surface plot using DEC's new Focal-based plotting program. The true-perspective plot, which can be used in gradient studies, can be output to any plotting device through appropriate interfacing.

Short Plotting Program Developed

MAYNARD, Mass. — A new program for plotting three-

dimensional surfaces in perspective, using a small digital computer with only a 4K memory, has been developed by Digital Equipment Corp.

The new graphics program, based on DEC's conversational language, Focal, uses only 15 lines of code. No mass storage peripherals are necessary, yet the program allows complex three-dimensional surface plots and Euler Angle rotations to be performed by even the smallest computer in the line, the \$5,500 PDP-8/L, when connected to any plotting system. It also can be used with the company's new, inexpensive graphics option, DEC says.

Useful in many areas of analysis, such as field gradient studies, the new plotting software will permit stereoscopic pairs to be generated for more refined visual investigations.

The plotting program, like the Focal language and the graphics option, can be used with any of the PDP-8 family of computers in their minimum configurations, according to DEC.

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with useful programs at minimum cost. Now eavesdrop on the next paragraph while we talk to the other fellow.

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Write us today, or have your secretary send in the coupon below. We'll send you a booklet with all the facts and the name of a Member Broker of Computer Multiple Listing Service in your area.


New 'Mini Maid' Aids Decisions On Acquisitions

PASADENA, Calif. — Through the use of a new software package, companies can improve their decisions on mergers and acquisitions, according to the developer, Economatix.

The package is designed as an extension of capabilities for the company's already available Maid (merger acquisition improved decision) package, according to company President Dr. Philip Clavier.

Clavier specifically pointed out that this new package, known as Mini Maid, is particularly useful when complete financial information is not available, or for initial forecasting of combined annual reports.

Merger goals can be specified to any desired degree and the odds of achieving these goals calculated. The program is written in Fortran IV and, according to Clavier, can be run on any second or third generation machine.



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Computer Now Controls Power Generation in NE

WESTBORO, Mass. — A computer-controlled generation and transmission pool comprising five electric utility companies now is supplying power to a 16,000-square-mile, heavily populated area in four New England states.

Called Remvec, this multi-company system is one of the most automated and advanced electric power control systems in operation today, said Stephen J. Sweeney, Remvec manager.

Remvec stands for Rhode Island, Eastern Massachusetts and Vermont Energy Control.

"The Remvec system," Sweeney added, "will automatically control 33 generating units by sending impulses from its computer to the generators which increase and decrease the power generation rate. Remaining units in the network are directly under the system's control, but are not automatic."

"Remvec will control 67 units, including nuclear, hydro, thermal, jet, and diesel generators."

In addition to a General Electric GE-PAC 4020 computer, the Remvec system employs a GE-TAC 7020 telemetering and control equipment system which includes three master and 18 remote stations. Datascan 760 CRT display, wall recorder displays, and a mimic board; analog backup equipment; and a backup power supply.

The center connects to generating stations and substations through a combination of a private, microwave telecommunications system, manufactured by GE, and leased telephone lines.

The GE-PAC computer is connected to the system by the GE-TAC supervisory and microwave telecommunications equipment which continuously transmits and receives digitally coded information on current flows, voltage levels, and power interchange and is capable of transmitting circuit breaker position status.

Data showing conditions at any given moment will be displayed on a large board in the control center.

The display at the control center provides the load dispatcher with an up-to-the-minute view of the power system.

Security Check

The process computer, in addition to continuously monitoring system conditions, performs a security check of the electric system. It spots abnormalities and alerts the system operator so he can take corrective measures.

The system operator can obtain additional information on station conditions simply by pressing a button which causes the request-

ed information to be displayed on a television screen.

The Remvec system serves approximately eight million persons who use more than one-half of all the electric power consumed in New England. By 1970, Remvec will have a generating capability of more than 6,600,000 kilowatts.

The application programs developed by GE for the Remvec system include scan, log, and alarm; CRT output; load-frequency control; economic dispatch; interchange schedule; daily generation schedule; spinning reserve; assured reserve; cost curve; load flow; security check; and information exchange to the New England Power Exchange.



The central control room for the computer-directed Remvec system is located in an underground facility at Westboro, Mass. System operators in this room continuously view the operation of the four-state system.

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Computerization Helps Show the Need For Broad-Based Health Record Forum

ANN ARBOR, Mich. — The Association for Health Records (AHR) formed here June 24 will seek to provide a multidisciplinary approach to problems in the field of medical and health records.

The group was created by some 80 persons from the United States and Canada called together by an ad hoc committee.

Those attending included systems analysts, computer process-

ing experts, statisticians, physicians, medical record librarians, nurses, hospital administrators, and others.

The ad hoc committee had called the meeting because the spreading implications of computerization, telecommunication, comprehensive planning, integrated health care, regional medical programs, health data banks, and other modern improvements were demonstrating

the needs for a new association to be a broad-based forum.

Committee officers are all from the Commission on Professional and Hospital Activities, Ann Arbor. They are co-chairman William H. Kincaid and Edwin G. Stephenson; Paul G. Gustafson, treasurer, and Majorie Zernot, R.N., secretary.

For more information contact Association for Health Records, P.O. Box 432, Ann Arbor, Mich. 48107.



COMPUTERWORLD

Societies

New ACM Quarterly Shows Major Change in Format

NEW YORK — The Special Interest Group on Business Data Processing of the Association for Computing Machinery has re-

leased its new quarterly, which represents a major change in format and content from the old newsletter.

The name of the publication is *Data Base*, according to Joe N. Adams, of Computer Applications & Studies, Inc., chairman of the group.

Adams said that *Data Base* will feature articles with a strong practical flavor, and will therefore be of particular interest to data processing professionals faced with difficulties in applying computers to the solution of business problems.

Data Base will not duplicate other ACM publications, will not imitate other publications in the computer industry, and will not carry advertising, according to Adams.

Editor of the publication will be Oscar M. Palos of Stanford Research Institute, Menlo Park, Calif.

The quarterly is sent without additional charge to all group members. Non-member subscriptions are \$10 per year. Information may be obtained by writing ACM, 1133 Avenue of the Americas, New York 10036.

AIAA Computer Systems Group To Hold Meeting

NEW YORK — The first technical specialist conference organized by the Computer Systems Committee of the American Institute of Aeronautics and Astronautics (AIAA) will be held in Los Angeles, Sept. 8-10.

The meeting at the International Hotel will emphasize the role of computer and computer systems in the aerospace field.

Theme of the meeting will be the rapid development of airborne computers and ground-based equipment through new technology, methodology, and approaches to old applications.

The ten technical sessions are designed to promote the interchange of information on all aspects of computer technology applied to aircraft, boost vehicles, and space vehicles.

Hardware and software considerations will be examined, and sessions will cover topics of simulation, interactive systems, and computer-aided design.

Further information concerning the conference may be obtained from AIAA Headquarters, 1290 Sixth Ave., New York, N.Y. 10019.

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Computer Techniques, R&D Management Will Be Discussed at Ohio University

ATHENS, Ohio — Effective management of ideas and creative people will be the purpose of the Seventh Annual Research and Development Management Program to be held Oct. 5-17 by Ohio University, Athens, and the Columbus Laboratories of the

Battelle Memorial Institute.

The two-week course is designed for scientists and engineers with managerial responsibilities. Information in the program is planned to aid both those men who have recently assumed managerial positions as well as veteran members of research management.

Faculty for the program will be selected research and management specialists from Case Western Reserve University; Duquesne University; Harvard University; Menninger Foundation; University of Michigan; Monsanto Chemical Corp.; Newton College; *Scientific American*; Sterling Institute; University of Texas; Battelle Memorial Institute,

and Ohio University.

Among the faculty are such well known author-speakers as James L. Hayes, Charles D. Orth III, Dr. Frederick Herzberg, Dr. Norman R.F. Maier, and Dr. Harry Levinson.

Program topics include the problems, objectives, and theory of R&D management, operations research, computer use, technological forecasting, human behavior, motivation, creativity, and computer-aided decision techniques.

Official programs with detailed information and application forms are available through Continuing Education, 309 Tupper Hall, Ohio University, Athens, Ohio 45701.

Nonprofit Group Gives Computers To University

SANTA CRUZ, Calif. — A gift of two Burroughs Model 220 computer systems has been made to the University of California here by the Allstate Foundation, a nonprofit organization sponsored by the Allstate Insurance Companies.

Purchased by Allstate in 1961 for \$1,200,000, the equipment is currently valued at \$320,000. Each of the two systems includes a processor, a memory-control unit, a console, six magnetic tape drives, a magnetic tape controller, and a Cardatron.

According to Dr. Harry D. Huskey, professor of information and computer science and director of the UCSC Computer Center, the equipment will be used on the campus for student instruction in computer science.

It is expected that many students will also use the computer in independent study projects requiring hands-on time. Such projects, undertaken individually under the direction of a faculty advisor, have included the analysis and composition of music, translation of foreign languages, and the compilation of data on human behavior.

The UCSC Computer Center, opened in 1967, supports research in physics, anthropology, and the arts, as well as contributing to the curriculum in information and computer sciences.

Public Computer Education School Opened in Canada

TORONTO — Control Data Canada, Ltd. opened the first Canadian public computer education school to be operated by a major computer manufacturer.

The school, Control Data Institute, is located at 50 Half-crown Place, Willowdale. It is designed to accommodate up to 630 tuition-paying students.

Applications are now being accepted for the fall term in computer programming and computer technology courses.

W. Gary Glover, president of Control Data Canada, Ltd., said the new institute will help fill the need for trained computer programmers and technologists for Canada's rapidly growing number of computer installations and electronics industries.

The Toronto Control Data Institute, one of 18 operated in North America and Europe by Control Data, will be headed by William D. Miller.



COMPUTERWORLD

education

mtwtf calendar mtwtf

Aug. 11-14, New York — American Management Assn.'s Fifth Education & Training Conference. Contact: American Management Assn., 135 W. 50th St., New York, N.Y. 10020.

Aug. 18-19, Chicago — An Introduction to Decision Logic Tables. Contact: EDP Professional Development Institute, 1625 25th St., S.E., Washington, D.C. 20020.

Aug. 19-22, San Francisco — Western Electronic Show and Convention. Contact: Weacon, 3600 Wilshire Blvd., Los Angeles, Calif. 90005.

Aug. 21-22, New York — An Introduction to Decision Logic Tables. Contact: EDP Professional Development Institute, 1625 25th St., S.E., Washington, D.C. 20020.

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patibility. Maintenance by GE technicians. And, if that's not enough, GCC also offers a full range of related services. Project management. Time-sharing. Even computer leasing. So, if you're in the market for a data storage unit, you ought to be clipping our coupons.

For your copy of the brochure describing the all-new GCC 3311, write to: Mr. T. J. Rogers, Greyhound Computer Corporation, 130 S. Canal St., Chicago, Ill. 60606

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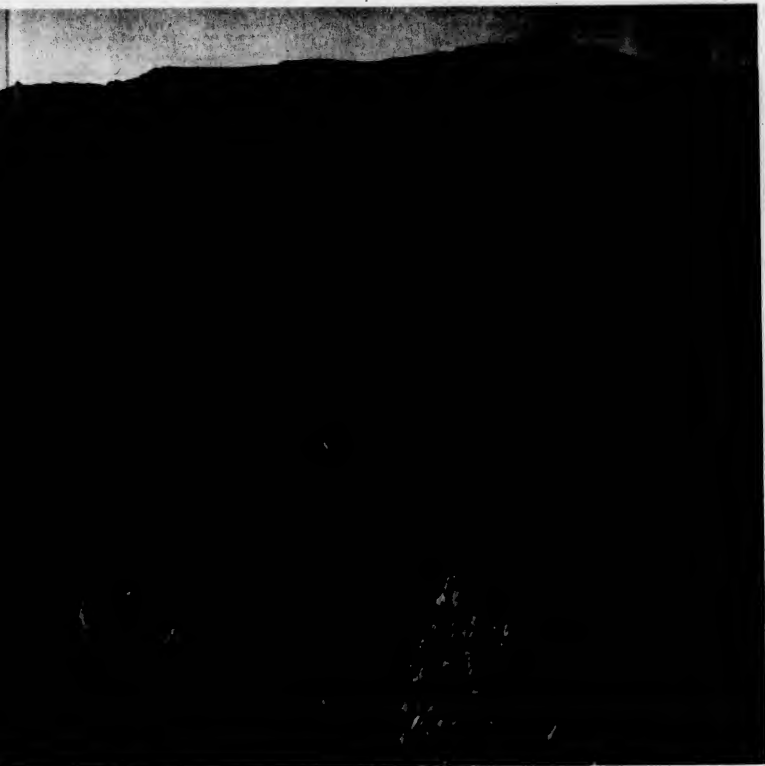
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Communications and Data Products Division

New Literature

A four-page brochure is offered covering systems consulting and programming services of URS Data Sciences Co. in Oak Brook, Ill. It describes how URS specialists help develop software systems, produce conversion aids, design application systems, and provide programming support to assist EDP users in achieving maximum utilization of computer facilities. Write URS Data Sciences Co., 800 Enterprise Drive, Oakbrook, Ill. 60521.

The Dynamic Computer Systems Multi-purpose Information Processor is described in a brief text and explanatory illustrations in a six-page color brochure available from Dynamic Computer Systems, Suite 325, Houston Natural Gas Bldg., Houston, Texas 77002.

A new six-page, two-color brochure describing the Invac On-Line and/or Off-Line Paper Tape Preparation Centers has been released by Invac Corp., a division of Digitronics Corp., 26 Fox Road, Waltham, Mass. 02154.

An eight-page color brochure which outlines the scope of Telexmax communications network and introduces the Telexmax keyboard and CRT terminals is available from Doug Cookson, Telexmax Corp., 4 Kingsbridge Road, Fairfield, N.J. 07706.

Helpful hints on getting more use from printer ribbons, benefits of various ribbon fabrics, and the necessity for proper ink and inkling are illustrated in a four-page brochure (GEA-8645) from General Electric Information Systems, Bldg. 207, Schenectady, N.Y. 12305.

Details of its general purpose transaction document scanner are available in a four-page brochure from Cammco-Chicago Corp., 4740 N. Ravenswood Ave., Chicago, Ill. 60640.

A guide to fanfolded perforator tapes with tips on using them has been published by Robins Data Devices, Inc., College Point (Flushing), N.Y. 11356.

The feasibility of utilizing shoebox filing in computer room installations is explained in Market Information Bulletin (No. 2-613) issued by the Technical Products Division, Brunswick Corp., 69 W. Washington St., Chicago, Ill. 60602.

Capabilities and applications of the Genisco Model 10-110 magnetic tape recorder are described in a data sheet from Genisco Technology Corp., 18435 Sunset Road, Compton, Calif. 90221.

A bulletin describing the information systems analysis services offered by the Westinghouse Information Systems Laboratory is available by writing for bulletin B-9557, Westinghouse Electric Corp., P.O. Box 568, Pittsburgh, Pa. 15230.

Description and specifications of the complete line of Ampex magnetic tape drives, core memories, and memory components for computer manufacturers and users are in a pocket catalog C105. Write Ampex Corp., Los Westfall, Mail Stop 7-13, 401 Broadway, Redwood City, Calif. 94063.

A four-page prospectus gives details on a new 25-week on-the-job training program for managers, supervisors, or part-time systems people. Called the Basic Systems Course, it is available from Systemation, Inc., P.O. Box 730, Colorado Springs, Colo. 80901.

A data set capable of operating over private lines of the DDD network is described in a bulletin available from Sengano Electric Co. Write for Bulletin 5318, P.O. Box 359, Springfield, Ill. 62705.

A 16-page brochure describes the complete line of timing instrumentation equipment available from Datatron, Inc., 1562

Reynolds Ave., Santa Ana, Calif. 92705.

A six-page color brochure on individual computer file security devices (tape and disk) is available by writing to Data Lock Division, Dynamac, Inc., 2745 Berrice Road, Lansing, Ill. 60438.

A brochure which describes Computer Technologies, Inc.'s facilities and services is available from the company's offices at 2001 Canal St., New Orleans, La. 70112.

The language evolved from Basic by Tymshare, Inc., for use by its subscribers who dial directly into centralized comput-

ers via telephone or teletype lines, is covered in a manual called Super Basic from Tymshare, Inc., Marketing Information Dept., 525 University Ave., Suite 220, Palo Alto, Calif. 94301.

A 16-page brochure including a three-page chart of specifications on all popular optical scanners is available from Advertising Dept., Fort Hume Paper Co., Fort Huron, Mich. 48060.

Consolidated Software, Inc. has published a corporate capabilities brochure outlining the mission of the company and the services it provides. Write the company at S.E. 42nd St., New York, N.Y. 10017.

A brochure explaining correspondence courses in computer programming is available from Public Relations, Dept. CP 1, International Correspondence Schools, Division of Intext, Scranton, Pa. 18515.

A 16-page illustrated brochure which describes the Astrodata Comcor 350 Analog Computer is available from Charles J. Marsh, Product Manager, Astrodata, Inc., 240 East Palisade Road, Anaheim, Calif. 92803.

Perforator tapes and related accessories in the industry are described in a 20-page catalog issued by Robins Data Devices, Inc., College Point (Flushing), N.Y. 11356.



It says: Pardon my prognostication... but pandulation as applied to your present computer is problematic. Provide peripheral paraphernalia permitting more proficient, profitable performance... preferably the

MDS 7500 SYSTEM

In plain English, there's a limit to how far your computer's on-line capabilities can be stretched. Switch your slow-down operations to the off-line MDS 7500 SYSTEM.

The MDS 7500 System provides a "flexibility package," with multiple off-line capabilities that take the squeeze off your computer. We call it the "Computer-Stretcher." It works equally well adjacent to your computer, or in a remote location.

The 7500 is an off-line data conversion system presently offering five different types each of input and output devices. The complete 7500 System consists of the 7505 Magnetic Tape Handler/Controller and Keyboard; 7517 Punched Card Reader; 7526 Card Punch; 7515 Paper Tape Reader; 7525 Paper Tape Punch; 1320 Buffered Line Printer.

Units in the system are cable-connected. With the addition of a modem, the system can communicate with another 7500 System, or an 1103 or 6403 Data-Recorder. Switches permit selection of an input and an output device.

A minimum 7500 System consists of the Magnetic Tape Handler/Controller and one of the other units.

The 7505 CONTROLLER is the primary component. It accepts data from magnetic tape, from a data communications module, from cards, paper tape or the keyboard. Data then is channeled to a selected

New Literature

A bulletin describes the urban and regional information system services offered by the Westinghouse Information Systems Laboratory. Write for Bulletin B-9548, Westinghouse Electric Corp., P.O. Box 868, Pittsburgh, Pa. 15230.

A manual on editing of time-sharing language is printed in two colors to distinguish user input from output and give the user the ability to change, insert, or delete text. It is available for \$1.50 from Tymshare, Inc., Corporate Marketing, Suite 280, 525 University Ave., Palo Alto, Calif. 95301.

A booklet describing the expanded line of ICC data com-

munication products is available from International Communications Corp., 7620 N.W. 36th Ave., Miami, Fla. 33147.

A ten-page, two-color brochure describing the Inver Digital Data Logging System, which converts analog or digital data into computer usable formats in punched tape, page printout, and other media has been released by Inver Corp., Division of Digitronics Corp., Waltham, Mass.

An 18-page brochure describing the hybrid computing systems which can be built around the EAI 640 Digital Computer is available from Electronic Associates, Inc., Bulletin No. 957025, West Long Branch, N.J.

A bulletin describing a file management system for the IBM/360 which allows accessing of "disked" records either sequentially or non-sequentially; provides for maintaining generation data sets and back-ups without copying entire files; services teleprocessing terminals; requires knowing only seven verbs; and works with any IBM-supported language is available. Write Automatic Information Management, 16033 Ventura Blvd., Encino, Calif. 91316.

A descriptive catalog on punched badge readers, which outlines complete technical specifications, uses, and selective options is available from Programming

Devices Division, Sealestro Corp., 225 Hoyt St., Mamaronock, N.Y. 10543.

Brochures outlining Executive Computer Systems' total service philosophy and the capabilities from the computer room construction and computer leasing through total turnkey management are available from Executive Computer Systems, Suite 720, 1211 W. 22nd St., Oak Brook, Ill. 60521.

A 52-page bibliography of data sources prepared for marketers in the electronics industry may be obtained at \$25 per copy from Nees Consultants, 422 Waverly St., Palo Alto, Calif. 94301.

An illustrated brochure describing the Series 3900 Astrover data acquisition instrument is available from C.D. Gieg, Manager of Instrumentation Products, Astrodata, Inc., 260 E. Palisades Rd., Anaheim, Calif. 92803.

A five-bar optical character recognition system is described in an illustrated 10-page brochure, GEA-8567, from General Electric Information Systems, Bldg. 6-207, Schenectady, N.Y. 12305.

A tan-panel brochure which explains how information management techniques can help a firm use all its data to best advantage is available by writing on your letterhead to Moll Associates, 372 Main St., Watertown, Mass. 02172.

A two-page bulletin, #U2569, describes and illustrates the Ultracom Data Communication system, which eliminates multi-line leased transmission lines. Write Ultracom Systems Corp., Mt. Laurel Industrial Park, P.O. Box 315, Moorestown, N.J. 08057.

The capabilities and services offered industry by the Westinghouse Information Systems Laboratory are described in a pocket-sized brochure. Write for B-9545, Westinghouse Information Systems Laboratory, 2040 Ardmore Blvd., Pittsburgh, Pa. 15221.

"Scheduling Techniques for Improved Business Planning" is the subject of Applications 69, a technical bulletin available from Computer Applications Inc., T.J. Swift, Manager of Corporate Communications, 555 Madison Ave., New York, N.Y. 10022.

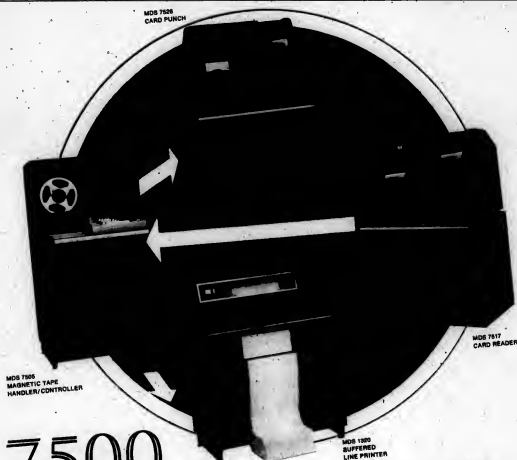
A comparison of the TSC/System 16 and the SBC "Call/360" time-sharing systems has been published in an information bulletin prepared by Time Share Corp., Lyons Road, Hanover, N.H. 03755.

An AGT/5 system reference manual describing the latest addition to its line of interactive graphics terminals is available from Adams, Inc., Leonard D. Saxon, Manager of Marketing Services, 1079 Commonwealth Ave., Boston, Mass. 02215.

A 28-page color catalog featuring 20 sizes of standard boards and over 80 accessories for the Magnetic Visual Control Systems may be obtained from Methods Research Corp., 105 Willow Ave., Staten Island, N.Y. 10305.

A six-page brochure outlining the advantages of a self-contained, air-cooled conditioning system that also includes an optional split system with remote air-cooled condenser designed to meet the requirements of data processing centers is available from Typhoon Air Conditioning Co., 505 Carroll St., Brooklyn, N.Y. 11215.

A catalog describing Punched Card Accessories, Ltd.'s line of data processing accessories is available from the U.S. distributor, J.S. Smith, Inc., 293 State Street E., Westport, Conn. 06880.



7500

output unit to produce either magnetic tape records, punched cards, paper tape records, communication messages, or printout. The 1300 Buffered Line Printer can operate simultaneously with any of the other output devices.

OTHER COMPONENT UNITS

7605 MAGNETIC TAPE HANDLER: Input/output medium reads or writes at 500 bpi density on either 7 or 8-channel magnetic tape... a 7-channel 7605 also can read 900 bpi tape... max. record length, 180 characters... BCD, EBCDIC or USASCII tape codes.

7616 PAPER TAPE PUNCH: Reads 5, 7 and 8-channel tapes.

7628 PAPER TAPE READER: Punches data in 5, 7 or 8-channel codes (paper, mylar or mylar-combination tapes).

7628 CARD PUNCH: Rated speed—200 fully punched 80 column cards per minute... maximum speed—300 cards per minute, punching 16 columns... Hopper/Stacker capacity 1000 cards each.

7617 CARD READER (standard): Reads 80-column cards, face down, at 1000 cards per minute... Hopper/Stacker capacity 1000 cards each... effective throughput rate approx. 600 cpm.

7616 CARD READER (optional): Reads 51 or 80-column cards, face up (face down optional) at 400 cards per minute... Hopper/Stacker capacity 500 cards each.

1300 BUFFERED LINE PRINTER: Prints 132 columns, operating at a nominal rate of 300 lines per minute. It can operate in EOL, List or Line Edit mode.

If your computer is up tight, investigate the computer-activating possibilities of the MDS 7500 system. Ask for full details.

YOUR COMPUTER'S BEST FRIEND

MOHAWK MB.
DATA SCIENCES CORPORATION
P. O. Box 600 • Palisade St., Westport, N.Y. 10596 • Tel. 516/866-0000
MDS CANADA LTD. • 26 Laurier Road, Don Mills, Ontario • Tel. 416/440-0740

Iomec Starts Business With an On-Line Mass Memory

SANTA CLARA, Calif. — Iomec, Inc. has been organized to specialize in total systems approaches to the problems of data storage, and is currently introducing its first product, the Series 1000 storage subsystem, to original equipment manufacturers.

The Series 1000 is an on-line mass memory system designed for small- to medium-size computers. It includes both disk drives and a storage controller. The drive, employing single disk removable cartridges, are used for access to larger volumes

of data, on-line storage extension for lower use programs and data, and fast access storage for high activity programs and tables. Series 1000 is expected to reach the market before the end of the year.

Iomec has completed its initial financing. Participants in the financing were EDP Resources, Laurence S. Rockefeller, Arthur Rook, Data Science Ventures, and Hornblower Weeks-Hemphill, Noyes.

Harold E. Edes, Iomec president, was with IBM from 1955-1968. For the past three

New Companies

years he was responsible for planning, development, and market planning of all IBM direct-access storage subsystems. Iomec is located at 345 Mathew St. here.

Remote Terminal Market Is Goal of Remcom Systems

GARLAND, Texas — Remcom Systems, Inc. is a new-genera-

tion computer equipment company whose target is the remote terminal market.

Norm Young is president of Remcom and Wally Potter serves as chairman of the board of directors and executive vice-president.

Remcom expects to be in production by the first quarter of 1970 with a new-generation family of remote batch terminal systems which will match the performance rates of batch terminals presently on the market, but will be priced significantly below the competition.

Specifications for the remote batch terminal system include a 132-line, 150-, 300-, and 600-line/min printer and a 300 card/min reader with up to 9,600 baud communication capability. Optional peripheral equipment will include a card punch, CRT, and paper or magnetic tape. Pricing will be under \$20,000 per system.

Remcom is located at 2705 National Drive, Garland, Texas.

Datetrol Builds Displays And Communications Units

HUDSON, Mass. — Datetrol Inc., a newly formed electronics hardware manufacturing company, has begun operations here. It will specialize in digital data communications equipment, computer displays, and industrial control systems.

President of Datetrol is Bob Frank, who initiated and ran Digital Equipment Corp.'s sales training program.

Four products are already being marketed and several others are under development. Present products include a display unit and three communications interfaces.

Mobark Aims at Magnetic Tape Recording Systems

MOUNTAIN VIEW, Calif. — Mobark Instruments Corp. has been formed to develop and produce digital magnetic tape recording systems.

The company has begun final development of a new type of magnetic tape recorder for data terminals and computer networks based on recent U.S. patents obtained by Moghazli F. Barkouki, founder and president.

Corporate financing has been arranged by a private venture capital group headed by Mobark director Alan B. Simpkins. Simpkins was president of Delcon Corp. and later was general manager of the Delcon division of Hewlett-Packard Co.

Mobark Instruments Corp. is located at 1273 Terra Bella Ave., Mountain View, Calif. 94040.

T/S Network Planned

RED BANK, N.J. — Northeast Computer Institute, Inc. is forming a new corporation which will establish a computer time-sharing service network.

Stanley D. Gilbert, president of NCI, said the new company, to be known as Terminate Computer Corp., will be 50% owned by NCI.

Terminate will operate initially in the northern New Jersey area. In addition to providing a time-sharing service, it will develop and market computer software packages for business, scientific, and educational use.

CAI Service Centers To Be Spun Off

NEW YORK — Computer Applications Inc. will form a new corporation for its activities in the data processing service center field. It currently operates seven such centers throughout the country.

Computer Applications will offer for sale to the public approximately 20% of its stock in the new company.



John Carvies, Director of Research and Special Projects, conducts a project team briefing session at ODSS. Mr. Czerniak, with 15 years in data processing, has extensive experience in designing complex software systems.

Is there a creative way of looking at data processing?

We think so — and that's why our Research and Special Projects Division was formed. This group of data processing professionals specializes in the use of new technologies to realize the full potential of existing systems.

Like finding a way to identify and measure all jobs processed, bid equitably, and exercise quality control over systems usage — a problem solved by the Division's recently announced OS-360 MVT-MFT Job and Step Resource Accounting Routines, the keystone of a projected Installation Management Planning System. . . . Or taking a fresh approach to the challenge of conversion across machine boundaries by designing

an IBM 1400 to COBOL Translator Program.

The Division has other proprietary programs in the design stage and is prepared to acquire complementary programs from outside sources. It will also enter into joint ventures in such areas as time-sharing, operating systems, extensions, tele-processing, project control, systems support programs and language processors. . . . as well as consulting on software and hardware problems.

If you would like to have someone take a creative look at your data processing operation, why not check your specific area of interest on the coupon below. Or better still, call us. We will be glad to discuss your requirements with you.

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Gentlemen: I want to know more about your organization's service and capabilities in . . .

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☐ Educational Services ☐ Data Entry ☐ EDP Personnel Recruitment ☐ Data Communications ☐ Facilities Management

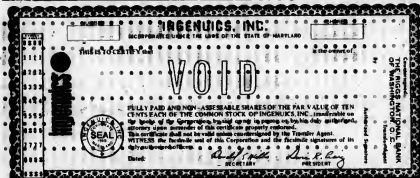
NAME

TITLE

(Please attach this coupon to your letterhead.)

August 6, 1969

Page 21



Reproduction of Ingenuics' punched-card stock certificate at 70% of full size.

New Punched Certificates Issued

GAITHERSBURG, Md.—A new type of stock certificate for publicly held companies, the punched card, replaced the older, bulkier paper certificate when a suburban Washington, D.C., firm publicly offered its stock for sale on July 14.

The use of the punched card stock certificate is the result of a joint effort between Ingenuics, Inc. of Gaithersburg, Md., the information records marketing department of IBM, and the trust department of The Riggs National Bank of Washington. Ingenuics was formed in 1968 to market optical and photographic products bought from and originally developed by a major aerospace corporation.

Use of the punched card stock certificates and the U.S. Treasury's Savings Bonds are now punched cards, Ingenuics believes it will be the first industry trial corporation to use the cards for its stock certificates, noted company President Edwin R. Craig.

new issue, and may be a first step toward overcoming the paperwork bottleneck now engulfing the securities industry," Craig said. He listed the advantages as: easy transfer, reduced costs, faster updating of records, folding eliminated, and a size that fits into safety deposit boxes.

The outstanding stock using the conventional certificate will be replaced by the new punched card certificate.

Describing the stock certificate, Craig said each will:

- Conform to the standard punched card size for computer processing, will have rounded corners, and be pre-punched with each certificate serial number.
- Use the Ingenuics logo overprinted on a field of miniature logos in green safety tinting ink to discourage alteration of the document.
- Have two other punching positions for the number of shares and the owner's account number.

He said the IBM-designed cards are produced and pre-punched at the IBM plant in Washington, D.C., that prints the Treasury Department's Savings Bonds Certificates.

ificates as well as all government-issued checks and postal money orders.

Boothe Sets New Records, Seeks IBM Negotiations

SAN FRANCISCO—Boothe Computer Corp. has reported record revenues and earnings for the second quarter and six months ending June 30.

The computer leasing firm also announced it is entering into negotiations with IBM for an adjustment in charges as a result of that firm's recent price separation statement.

In announcing the impending IBM negotiations, D.P. Boothe Jr., chairman of the Board, stated, "It is our opinion that IBM is attempting to unilaterally negotiate their contractual agreement with our firm.

"We further believe that we purchased and prepaid for full software and system support services for the life of the units and that there is now a unilateral proposal to charge our customers directly for such services effective Jan. 1, 1970."

"It is obvious that we cannot accept this, and we are entering into negotiations with IBM to either continue these services to our customers without additional charge or compensate us for the value of the services for which we had previously contracted," Boothe said.

Boothe further stated, that although it will take some time for the company to fully analyze the long-term implications of IBM's action, it does not in any way reduce the value of his company's computer hardware portfolio.

No significant impact on immediate revenues is foreseen; and, in the long run, the change is expected to be beneficial to the company and its various divisions.

Revenues for the second quarter were at a new high of \$9,552,078, and earnings were up to \$703,282 for the three month period ending June 30. This compares with revenues of \$3,147,635 and earnings of \$225,259 for the second quarter a year ago.

NCR's Century Steps Income, Revenue

NEW YORK—A 19% increase in consolidated net income and a 10% increase in worldwide revenue for the first six months of the year have been announced by the National Cash Register Co.

Robert S. Oelmann, NCR chairman, said earnings for the period rose to \$16,621,348, compared with \$13,975,431 for the first half of 1968. Worldwide revenue through June 30 totaled \$560,709,959, compared with \$510,328,912 for the comparable six-month period last year.

The six-month 1969 earnings

amounted to \$1.61 per share, based on an average of 10,330,675 shares outstanding. This compares with \$1.46 per share on the 9,596,096 average number of shares outstanding last year.

Both the revenue and net income figures represent new records for the period. Oelmann said the favorable earnings trend was the result of increased volume and further maturing of NCR's investment in equipment for customer rental. During the second quarter, he said, NCR's equipment installations continued at a high level. He added that deliveries of the company's newest computer family, the NCR Century series, are accelerating rapidly and are becoming a sizable factor in total delivery volume. Performance of the systems has resulted in highly favorable customer acceptance, he added.

The NCR chairman said that incoming orders for equipment, both electronic data processing systems and other business machines, maintained during the second quarter the momentum achieved during the first three months of the year and are running well ahead of the comparable period of 1968.

Service revenue and the sale of business forms and supplies also have continued to register sizable gains over last year, Oelmann added.

Computer Short Interest Drops on Both Exchanges

NEW YORK—Short interest on both the American and New York stock exchanges dropped to its lowest point since late 1967 during the month ending July 15 and selected computer companies' short interest followed suit.

Computer short interest on the American dropped about a third from 658,087 shares to 438,937 shares, a drop of 219,150.

Computer short interest on the NYSE dropped 381,331 shares to 1,521,995 from 1,903,326. These figures reflect a 3-for-1 stock split in Xerox, and a 5-for-2 split in Computer Sciences.

The seller generally anticipates a price drop that will enable him to repurchase an equal number of shares at a lower price.

The short interest is the number of shares not repurchased for return to lenders and represents, in effect, a definite backlog of potential buy orders.

The following tables show the New York and American computer stocks in which a short position of at least 20,000 shares existed on July 15 or in which there was a short position

change of at least 10,000 shares since June 13.

NEW YORK STOCK EXCHANGE	
July 15	June 13
Amper Photocopy	21,750 22,100
Bunker Ramo	13,015 23,688
Collins Radio	26,150 22,100
Computer Sciences	72,045 149,315
Control Corp.	137,103 101
General Electric	27,306 23,228
Hewlett	27,306 23,228
IBM	45,821 54,225
Intelligence	27,306 23,228
Memorex	25,775 20,315
Perkin-Elmer	27,306 23,228
RCA	12,814 10,317
Sony	27,306 23,228
Sperry Rand	112,309 107,402
Varian Assoc.	27,306 23,228
World Data	54,225 766,594
AMERICAN STOCK EXCHANGE	
July 15	June 13
Aerodata	10,617 88,898
CompuShare	19,877 21,877
Control Corp.	27,306 23,228
Data Process	44,918 81,069
Data Prod.	82,425 218,512
Digital Equip.	27,306 23,228
Leasco Data Sys 74	25,108 45,295
Levin-Town Corp.	80,493 101,300
Mohawk Data	27,306 23,228
Telex	25,108 45,295

Leasco/Argamon, OK

LONDON—The Board of Trade has indicated that it will not oppose the \$60-million takeover of Leasco Data Systems by Argamon Press Ltd. of England.

The acquisition already had received special approval from the Bank of England.

Card Advantages — "As we see it, the specially designed IBM cards have several advantages, particularly for a

CDC Reaches Agreement to Acquire Marshall Communications Company

MINNEAPOLIS—An agreement in principle has been achieved for the acquisition of Marshall Communications of Santa Ana, Calif., by Control Data Corp. for over \$9 million in stock.

Marshall Communications, a partnership owned by Marshall Industries and MDM Communications, Inc., is engaged in the design, development, manufacture, and sale of large-scale data

communications systems. It is located at 2519 W. Warner Ave., Santa Ana, Calif.

The acquisition will be solely in exchange for shares of Control Data's common stock having a value of \$9,500,000 at the closing.

Under the terms of the agreement, Marshall Industries will receive \$7,300,000, and the balance will be paid to MDM Communications, Inc.

Applied Data Research Listed

PRINCETON, N.J.—The common stock of Applied Data Research, Inc., computer software and service company, has been approved for listing and trading on the American Stock Exchange.

Trading began on July 24. The stock is traded under the symbol ADR.

Applied Data Research, founded 10 years ago this month, has

its corporate headquarters and a research center in Princeton.

Management Data Declares Quarterly Dividend

PHILADELPHIA—Management Data Corp. has declared a quarterly dividend of \$1.875 per share of \$3.50 convertible preferred stock (series A), payable Aug. 1, 1969 to shareholders of record as of the close of business on July 18, 1969.

Dow Jones Down 27.86

Peripherals Below 3/1/68 Base

By A.B. Williams

Circuit writer

In what might be regarded as accidental, ten issues of the 102 in CW's tables went up during the week ended July 25. However, not one rose over a half point.

Any way you look at it, the week was a tough one for computer stocks. All indexes went down, and the week saw the peripherals sector break below its March 1, 1968, base.

Only one-third of the issues in that group show a net gain for that time span, which represents a period of nearly 18 months.

The sector showed no gains, but only two losses of more than 10%.

The biggest loser of the week, on points or percentage, was Sperry Rand.

While other mainframe manufacturers have been turning in entirely satisfactory earnings reports, Sperry's statement for the three months ended June 30 showed earnings very slightly down, despite a gain of better than 13% in sales.

The problems do not appear to have had anything to do with the Univac operations, but rather with the corporation's large commitments in the marine and aeronautical electronics areas.

In any case, the stock took off on the chin during the week ended July 25, with a loss of

12-1/4, closing at 40-1/4. Possibly adding to the trouble was a report from Arthur D. Little, Inc., suggesting that Univac might be in danger of losing some of its share of the computer market during the '70s.

Is Now the Time to Buy?

The market has gone sour—that's obvious. It will go up again—it always has. The standard question is "When?"

It doesn't look to us like a quick, long-lasting turnaround in the works. None of the pressure points has changed.

We still have the Vietnam mess. We still have tight, very expensive money. The moon effect didn't provide even a temporary lift for the market.

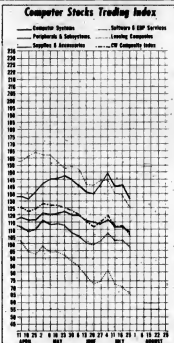
The only "good news" with even a 50% chance of being realized in the foreseeable future is passage of the income tax surcharge extension. And this is the kind of good news that costs money—money that otherwise might have found its way into the market.

The big mirror of the change in investor sentiment, and therefore in the market, is the apparent death of the newsmarket as the source of a quick buck. The last few rundowns on newsmarket performance that have crossed our desk have contained large numbers of names that would have been magic a couple of months ago.

Very few are even as high as their subscription prices, let alone in the black.

In any case, now could be the time to buy. A few nervous traders and many more patient investors will look back on right now at a time they were happy to have been in the market.

Many experts recommend keeping a strong cash position, waiting for better buys, perhaps in averaging down what has been bought in the last month.



This advertisement is neither an offer to sell nor a solicitation of an offer to buy any of these shares. The offer is made only by the Prospectus.

New Issue

July 15, 1969

100,000 SHARES



INTERMAC CORPORATION

Common Stock
(\$10 Par Value)

Intermac Corporation plans to offer computer time sharing and computer system development services. These shares are being offered by the Company to obtain new financing.

Price \$10 per Share

Copies of the Prospectus may be obtained from:

GENESEE VALLEY SECURITIES COMPANY, INC.

300 Powers Building, Rochester, New York
716-646-4380COMPUTER STOCKS:
TRADING SUMMARY

WEEK ENDED JULY 25, 1969

COMPUTER SYSTEMS										1967	1968
1969 CLOSING		1968 CLOSING		1967 CLOSING		1966 CLOSING		1965 CLOSING		1967	1968
RANK	PRICE	RANK	PRICE	RANK	PRICE	RANK	PRICE	RANK	PRICE	CHANGE	CHANGE
N 141-136	126 1/2	1	1	SIMULCRON CORP						+ 6 7/8	+ 6 1/4
N 68-53	43 1/4	14	14	COLLIER RADIO						+ 1 1/4	+ 0 1/4
N 100-43	100 1/2	1	1	COMPUTER DATA CORP						+ 1 1/2	+ 1 1/2
N 78-50	50	62	62	ELLERRE INDUSTRIES						- 3 3/4	+ 0 1/2
N 100-15	15 1/2	1	1	COMPUTER ENGINEERING						- 3 3/4	- 1 1/2
N 97-20	20 1/2	1	1	GENERAL ELECTRIC						- 3 1/2	- 1 1/2
N 75-82	82 1/2	1	1	COMPUTER DATA CORP						- 3 1/2	- 1 1/2
N 140-107	107 1/4	14	14	HYMOWELL INC						- 3 7/8	- 3 1/8
N 35a-91	91 1/2	1	1	IBM						- 1 1/2	+ 0 1/2
N 100-11	11 1/2	1	1	COMPUTER DATA CORP						- 1 1/2	- 1 1/2
N 68-38	38 1/2	1	1	IBM						- 1 1/2	- 3 1/2
N 68-24	24 1/2	1	1	COMPUTER DATA CORP						- 1 1/2	- 1 1/2
N 63-24	24 1/2	34	34	SPRINT CORP						- 1 1/4	+ 1 1/2
N 68-24	24 1/2	1	1	COMPUTER DATA CORP						- 1 1/4	+ 0 1/2
N 68-31	31 1/2	1	1	CONTROL HAND						- 1 1/4	+ 0 1/2
N 68-31	31 1/2	1	1	COMPUTER DATA CORP						- 1 1/4	+ 0 1/2

Aquisitions

Vernitron Corp. New York, has agreed to acquire Allied Plasma Corp. and its affiliate, International Bio-Science Corp. Both concerns are to be combined into Allied Bio-Science, Inc. and will operate as a wholly owned subsidiary of Vernitron, a technologically oriented company with interests in computer and control system components, medical equipment, data processing products, and transportation.

Information and Computing Centers Corp. has completed the terms of an agreement for the acquisition of Magnetec Services Ltd., a Canadian company based in Calgary, Alberta, that operates two medium-scale computer systems supplying services to the oil and gas industries in western and northern Canada.

Jersey Tab Card Corp., Union, N.J., a manufacturer of tabulating cards, has acquired the New York-New Jersey tabulating card business of Lewia Business Forms, Inc., Watts Division. In addition to tabulating cards, JTC markets and distributes other data processing supplies.

Computerology, Inc. of New York has completed the purchase of Automated Business Systems, Inc., of Watervliet, Conn., a supplier of specialized software and data center services to clients throughout the Eastern Seaboard.

Kalvar Corp. of New Orleans has entered into an agreement providing for the exchange of Kalvar common stock for all outstanding shares of Southern Microfilm Corp. a service or-

ganization providing microfilming, office copy, and other business services to companies in the New Orleans area.

Computerology, Inc. of New York has acquired Electronic Processing Center, Inc. for approximately \$600,000 of convertible preferred stock. At the same time, Computerology completed the purchase of all the business accounts and certain assets of Computer Systems Machine Accounting Co., Inc. Both companies acquired are located in Philadelphia.

Newell Industries, Inc. of Sunnyvale, Calif., has acquired Buske Electro-Optical Laboratories, Palo Alto, Calif., for an undisclosed amount of Newell stock. Burke develops and produces devices and systems that

DEC Receives 100 Orders For PDP-15s in 2 Months

MAYNARD, Mass. — More than 100 orders have been received for Digital Equipment Corp.'s newest computer, the medium-scale PDP-15, within two months of its introduction. The 18-bit machine, which is offered in four configurations, was announced in late April and made its debut at the Spring Joint Computer Conference. Initial reaction to the computer has caused management to study methods of increasing its production rate.

Early purchasers of the PDP-15 indicate they plan to use it in such areas as education, research, medicine, physics, and hybrid computation. Customers include colleges and universities

government agencies, and manufacturers of other equipment who plan to make the computer part of their product.

The four configurations of the PDP-15 include a basic system at \$16,500, an advanced monitor system at \$36,000, one designed for background/foreground applications at \$58,000, and a large disk-based background/foreground system selling for \$91,000.

Orders and Installations

A \$6-million Univac 1108 computer system has been installed at the Canadian Government Information Processing Center, which handles all phases of the Canadian Government's accounting operations. In the near future it will be linked by data communication lines to six regional centers throughout Canada and a Univac 9300 presently on order.

Computer Machinery Corp. has added the Security Title Co. to the list of customers that will install a KeyProcessing system to prepare data for input to its RCA Spectra 70/45 computer. The Model 9 CMC system with 19 keystations will be used mainly for abstracting new title information along with their general computer data preparation.

The Felixstowe Dock & Railway Co., a privately owned maritime port in England, has ordered a Honeywell Model 110 computer system to process the paperwork for freight shipments.

The Communications Satellite Corp. has placed a \$2,557,090 order with IBM for the purchase of a 360/65 computer system to be installed at Comsat's new laboratory complex in Clarkburg, Md.

Recent orders for Atlantic Software, Inc.'s Score information retrieval and reporting system have been made by: The Torrington Co., Torrington, Conn.; the Central Intelligence Agency, Washington, D.C.; The St. Paul Co., Inc., St. Paul, Minn.; Honeywell, Inc., Newton, Mass.; Pepisco, White Plains, N.Y.; Pacific Western Mortgage Co., Los Angeles, Calif.; and Regional Education Laboratory, Durham, N.C.

Digital Equipment Co.'s 680/1 data communications control system has been shipped to Pillsbury-Occidental Corp.'s Call-a-Computer division as a data concentrator.

Toshiba, a Japanese manufacturer, ordered an Idiom interactive graphic-display system from Information Displays, Inc., Mt. Kisco, N.Y., for use in the design of automobiles.

The Mayo Clinic in Rochester, Minn., has selected the Sanders Associates, Inc.'s electronic data display system, which is a portion of its Clin-Call hospital data management system, for more efficient entry and summarization of accounts for patients.

Develop your CRT film on-line...in 10 seconds

Now you can have a complete photographic processing laboratory attached to your computer.

Series 1200 Processors interface directly with any existing data recording camera, to give you high resolution, optimally processed film — 16mm, 35mm, or 105mm — at output rates as fast as 70 inches per minute.

The processed film is near-archival in quality and can be fed immediately to a projection/hard copy station, an on-line reader, or other peripheral device, as fast as it's processed.

Operation is simple. All you do is straight-line thread the film from the camera through the processor. The rest is automatic. You can process 2400 feet of film before replacing chemicals.

In addition, the processor is small enough to fit

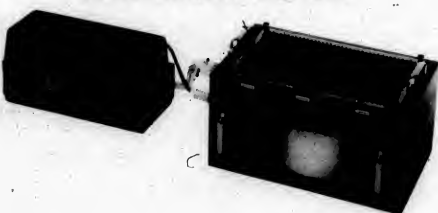
in your existing computer frame—in space that you're probably not now using. And the chemical supply can be located away from the processor, with no loss in performance.

Best of all, the Series 1200 uses a processing method that has been proven over many years, in numerous airborne and land-based recording applications. It produces uniform processing quality over the entire length and width of the film.

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Systems Engineering Labs Names Eglash New President, Randolph as Chairman

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories, Inc., has appointed A.G. Randolph chairman of the board and chairman of a new corporate finance committee, and Sheldon P. Eglash as president.

Randolph formerly was president of the company and Eglash was vice-president of marketing.

Randolph was one of the three founders of Systems Engineering, which began business in 1961. He joined the company as the first vice-president of marketing and as a member of the board of directors.

He became president Jan. 1, 1966. Under his management the company grew from 362 employees and \$5.2 million in

Executive Corner

sales to more than 800 employees and approximately \$17 million in revenues.

Randolph holds a bachelor's degree in electrical engineering from Georgia Tech where he also did postgraduate study in industrial management.

Before joining Systems Engineering as vice-president of marketing, Eglash was western region sales manager for Scientific Data Systems. He was also manager of systems application marketing and associate director of sales at SDS.

He holds a bachelor of science degree in accounting with honors from the University of California at Los Angeles.

Lindley Elected President Of Realtime Systems Inc.

NEW YORK — John C. Lindley has been elected president and a director of Realtime Systems Inc., a computer time-sharing and software company recently acquired by Chemical New York Corp., the one-bank holding company whose major subsidiary is Chemical Bank.

Lindley had been group director of business development in the defense space group at International Telephone and Tele-



A.G. Randolph



R.L. Palmer

graph Corp. From 1962 to 1967, he was vice-president for business development of the systems group at Litton Industries.

Before that, he held several positions at Burroughs Corp. including that of general manager of the defense marketing division.

Lindley is a 1940 graduate of the University of Missouri and a 1965 graduate of the advanced management program at the Harvard University Graduate School of Business Administration.

Palmer Becomes IBM V-P

ARMONK, N.Y. — Ralph L. Palmer has been elected a vice-president of IBM.

Palmer will be a special assistant for technology to Frank T. Cary, IBM senior vice-president and general manager of the data processing group.

Palmer joined the company in 1932 in Endicott, N.Y., as an engineer. Following naval service in World War II during which he specialized in electronics work, he was appointed senior electronics engineer in Poughkeepsie, N.Y., in 1946.

In the late 1940s he conceived and developed IBM's first commercially successful electronic calculator, the 604.

In 1950, he was appointed manager of the Poughkeepsie laboratory where he directed development of the company's first modern electronic computers, the 701, 702, 704, and 705.

He received a B.S. degree in electrical engineering from Union College.

Other Recent Appointments

□ Scientific Computers, Inc. of Minneapolis has announced the addition of William A. Hodder and Guy R. Dettleson to its board of directors.

□ Viking Industries, Inc., of Chatsworth, Calif., has elected Carl H. McBain, president of McBain Instruments, Inc., Van Nuys, Calif., to a previously unfilled seat on the Viking board of directors.

□ Dennis W. Hanson has joined Management Computer Network, Inc., of New Hampton, Iowa, as vice-president for data processing.

□ Leonard S. Slater has been appointed to the board of directors of Western Operations, Inc., San Francisco. He presently serves as vice-president of finance and treasurer, and is responsible for all financial and administrative affairs.

□ Computek, Inc., of Cambridge, Mass., has appointed Dr. Donald R. Haring technical director. He was also elected to the board of directors. Dr. Haring attended Lafayette College and graduated in 1957 with a B.S. in electrical engineering. He entered the Massachusetts Institute of Technology in 1957 with a Whitney Fellowship and received an M.S. degree in 1959, an E.E. degree in 1960, and an Sc.D. degree in 1962.

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New Registrations

GREENFIELD ELECTRONICS, INC., 893 Morris Ave., Rochelle, N.Y., a company engaged in the manufacture and marketing of miniature and micro-miniature components for electronic application in computers, military, and commercial communications equipment, electrical testing equipment, telematics devices, and in the aerospace industry, filed to register 100,000 shares of common stock. Proceeds, at \$1 per share, intended for manufacturing, laboratory, and field equipment. No underwriter is involved.

LEVIN-TOWNSEND COMPUTER CORP., 445 Park Ave., New York, N.Y., filed to register 25,000 shares of common stock. These shares are reserved for issuance upon conversion of \$15,000,000 of 5% guaranteed convertible debentures, due 1988, of Levin-Townsend International, Inc., a wholly owned subsidiary of the company.

LANGUAGE LABORATORIES, INC., 4823 Fairmont Ave., Bethesda, Md. 20814, a company engaged in the production, development, and marketing of programmed language courses and learning systems, filed to register 100,000 shares of common stock. Proceeds, at \$5 per share maximum, intended for mail-order marketing, for financing increased inventory, and for further reduction of debt. No underwriter is involved.

NYTRONICS, INC., Third Ave., Alpha, N.J. 07065, a company engaged in the development, design, production, and sale of electronic components for use in communications equipment, missile-control systems, computers, service, commercial radio and television, data handling, and navigational and industrial control equipment, filed to register 645,000 shares of capital stock. The stock will be offered in exchange for all the outstanding shares of Regio Engineering Products Limited at the rate of 1.41 shares for each Regio share. The underwriters are Barling, Grace and Co., 35 Broadway, New York, N.Y., and Gardner and Co., Ltd., 60 Wall St., New York, N.Y.

AMERICAN REGITEL CORP., 1011 Commercial St., San Carlos, Calif. 94070, filed to register 200,000 shares of common stock. The company proposes to engage in the development, production, and marketing of an electronic cash register system to be known as the Regitel System, and intends to market several of the components of the Regitel System and to attempt to enter into contracts with other manufacturers. In pursuing this work, the company would develop and produce computer peripheral terminal equipment and components for those manufacturers. Proceeds, at \$12.50 per share, intended for further development, production, and marketing of the Regitel System and its components. The underwriter is Amos Trest Associates, Inc., 79 Wall St., New York, N.Y.

ENGLISH DATA CORP., 40 Exchange Place, New York, N.Y. 10005, a company engaged in developing and operating a computerized system performing the functions of the manual work of brokerage securities firms, filed to register 125,000 shares of common stock. Proceeds, at \$4 per share, intended for administrative expenses, and for equipment purchase and rental. No underwriter is involved.

GENERAL COMPUTER SERVICES, INC., 1312 Meridian St., N.E., Huntsville, Ala. 35802, a company engaged in rendering general computer service to the public, filed to register \$2,500,000 of convertible subordinated debentures, due 1981, in arrears, at 100% of principal amount, intended to repay a promissory note repurchase facility approved to purchase computer equipment for its Huntsville center, to purchase equipment for a customer's facility near New Orleans, to develop software for facilitating input and retrieval through remote terminals of business data, and to design and install computer equipment. The underwriter is S.D. Fuller & Co., Inc., 28 Broadway, New York, N.Y.

UNIVERSITY CONCEPTS, INC., 23 Broadway, New York, N.Y. 10004, a company that intends to engage in establishing, developing, and operating new business ventures primarily, but not solely, in computer and education-oriented service and manufacturing industries of a scientific or technological nature, filed to register 165,000 shares of common stock. Proceeds, at \$3 per share, intended for addition to the company's working capital. No underwriter is involved.

TIME SHARING RESOURCES, INC., 388 Fifth Ave., New York, N.Y. 10001, a company that offers a time-sharing system capable of servicing about 50 users concurrently through a centrally located leased computer, filed to register 110,000 shares of common stock. Proceeds, at \$1.5 per share maximum, intended for computer rental and other corporate expenses. The underwriter is First Philadelphia Corp., 80 Wall St., New York, N.Y. 10005.

VANIER GRAPHICS CORP., 8747 Olive Lane, Santa, Calif. 92071, a company engaged in the design, production, and sale of continuous business forms used in electronic data processing equipment, filed to register 210,000 shares of common stock. Proceeds, at \$13 per share maximum, intended for acquisition, construction, and equipping of a manufacturing and warehousing facility and for retirement of short-term notes used in debt to equip a facility in Houston. The underwriter is Gloria Forgan, Wm. R. Blatts, Inc., 45 Wall St., New York, N.Y.

COMPUTER PREPARATIONS, INC.

Year Ended Jan. 31

1968	1969
Revenue	\$1,127,311
Earnings	\$646,637
Dividend	445,992
Dividend	33,342
Dividend	10

—Acquired for \$8,485 of prior year expenses which were paid in current year.

DEARBORN COMPUTER AND MARINE CORP.

3 Months Ended April 30

1968	1969
Revenue	\$7,720,000
Earnings	\$1,503,000
Dividend	174,000
Dividend	25

6 Months Ended April 30
Revenue \$13,662,000
Earnings \$2,484,000
Dividend \$19,000
Dividend 1.05
Dividend .45
a—Reflects amounts included retroactively due to an acquisition accounted for on a pooling-of-interests basis. Without this consideration, earnings per share would have been 77 cents and 28 cents for the three months, and \$1.49 and \$1.45 for the six months, respectively.

ANALOG DEVICES, INC.

8 Months Ended May 31

1968	1969
Revenue	\$3,710,432
Earnings	\$2,431,448
Dividend	244,926
Dividend	171,973
Dividend	20

—Computed on the weighted average number of shares outstanding during the periods after retroactive adjustments for stock splits and for the shares issued in connection with the acquisition of Motorola Electronics, Inc. in Jan. 1967, which we treated as a pooling-of-interests.

INDUSTRIES, INC.

9 Months Ended June 1

1968	1969
Revenue	\$30,387,000
Earnings	\$2,378,800
Dividend	3,151,500
Dividend	2,855,400
Dividend	1.08
Dividend	.71

a—Unaudited; b—After preferred dividends (\$35,292 in 1968 and none in 1969) and adjusted for 2-for-1 stock split distributed in August 1968. Based on assumption of exercise of all outstanding warrants, exercise options, and conversion of the \$1.70 convertible preferred stock at 1.31 common shares for each share of preferred.

APPLIED DATA RESEARCH, INC.

3 Months Ended March 31

1968	1969
Revenue	\$1,360,884
Earnings	\$775,850
Dividend	140,448
Dividend	75,150
Dividend	15
Dividend	.08

—Acquired for \$8,485 of prior year expenses which were paid in current year.

WALLACE BUSINESS FORMS

3 Months Ended April 30

1968	1969
Revenue	\$7,285,000
Earnings	\$6,821,800
Dividend	471,000
Dividend	431,800
Dividend	15
Dividend	.46

9 Months Ended April 30
Revenue \$21,235,000
Earnings \$18,796,900
Dividend 1,278,000
Dividend 1,116,000

SEISMIC COMPUTING CORP.

6 Months Ended March 31

1968	1969
Revenue	\$8,012,000
Earnings	\$2,954,000
Dividend	350,000
Dividend	125,000
Dividend	13
Dividend	.33

a—Revised to reflect acquisitions of Data Exploration Co., in April 1968, on a pooling-of-interests basis.



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